NOLOGY DEPT

APRIL 1953

The Paper Industry

PUBLIC LIBRARY
APR
DETROIT

LABORATORY TYPE FILTRATION
ON A MILL SCALE!

with the
WACO
FILTER

MPROVED
MACHINERY INC.
•
ASHUA, NEW HAMPSHIRE

Sherbrooke Machineries Limited manufacture similar equipment in Canada

IR v. 35 | Ap-S'53

ROTARY UNION

REG. U.S. PAT. OFF.

THE ROTARY STEAM CONNECTION

...Here's Insurance against Down-time

Where one "burp" from a rotary steam connection can shut down thousands of dollars worth of paper mill equipment, the ROTARY UNION is mighty valuable insurance against loss of production.

The Type "FSG" ROTARY UNION was designed especially for continuous heavy duty service on paper mill dryers, calenders, digesters, etc. It is flanged directly to the journal and revolves with the drum itself, thus taking the strain from moving and sealing parts. A heavy duty, metal-backed graphite bearing requires no lubrication and permits high speeds under high pressures and temperatures. Its two point syphon support takes excessive strain from syphon pipe threads and prevents wearing through and falling off of syphon pipes.

Many Type "FSG" ROTARY UNIONS have given perfect sealing service in paper mills for three years or more without requiring maintenance of any sort or causing one minute's down-time. Insure against loss of production in your mill by specifying Type "FSG" ROTARY UNIONS for all of your revolving equipment. Factory engineers are available at all offices for consultation on your problems. Call our nearest office or write Dept. 4P for our catalog.

Type "FSG" ROTARY UNION

"WHERE *Good Connections* COUNT"

REG. U. S. PAT. OFF.

PERFECTING SERVICE COMPANY

332 Atando Ave. (Home Office and Factory) Charlotte, N. C.

Offices in Chicago • Atlanta • Philadelphia • Providence • New York
Cleveland • Montreal • Toronto

Tech

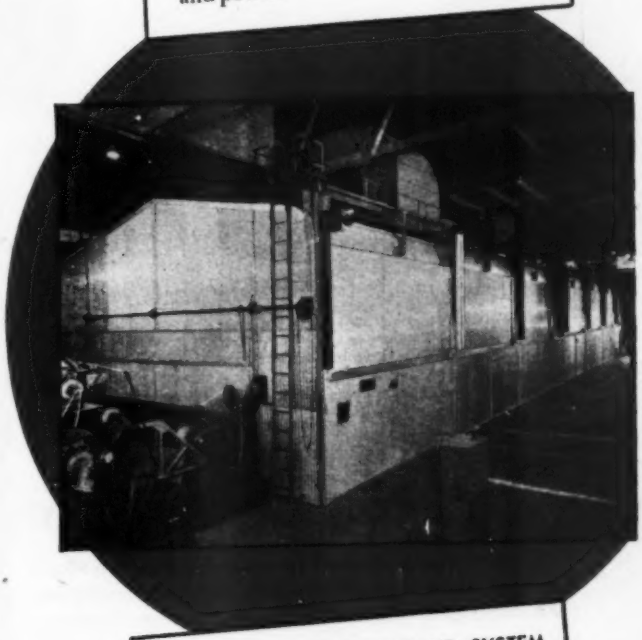
Watch ROSS for the newest developments in the paper industry!

NEW ROSS PULP DRYER

It eliminates the objectionable features of other methods. A well built unit with vital parts easily accessible. Equipped with counterflow principle, arranged for individual control of tension on each pass.

NEW ENCLOSED MACHINE HOOD

Entirely new design and type of construction provides increased efficiency, more uniform drying, reduced back pressure, improved working conditions and substantial savings in steam and power.



NEW TYPE GREWIN NOZZLES

With the experimental stage passed, this new improved Ross-Grewin Nozzle is now available to the paper industry. This nozzle is proving particularly effective on wide paper machines.

NEW TRIM CONVEYING SYSTEM

Now it is possible to pneumatically convey as a ribbon the trim from winders and rewinders for heavier basic weights. Vertical injectors can be used where space limitations bar horizontal installation.

NEW IMPROVED YANKEE AIR SYSTEM

NEW patented Double-Flo Yankee Air System which may double the effectiveness of some existing air handling units. Principle adaptable to present installations and will be applied on new ROSS applications.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

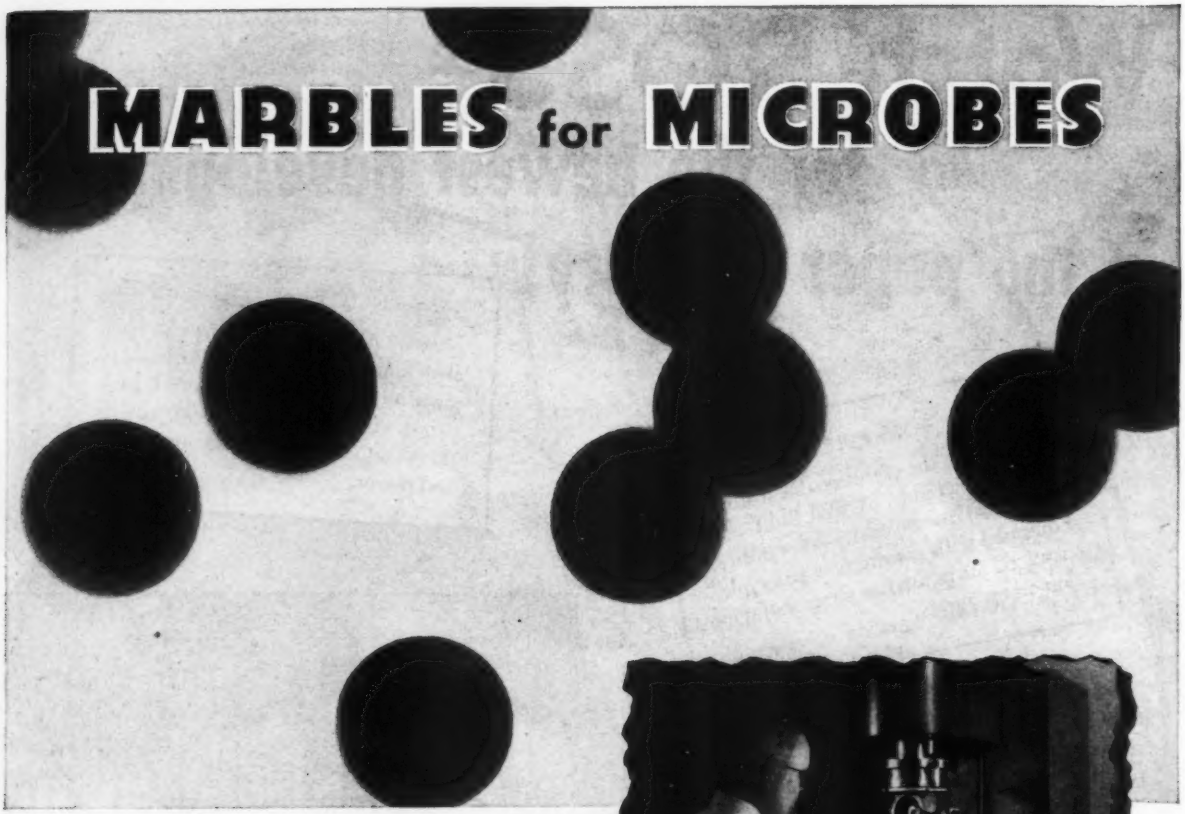
MANUFACTURERS OF AIR PROCESSING SYSTEMS

444 MADISON AVENUE NEW YORK 22, N. Y.

BOSTON • DETROIT • CHICAGO • SEATTLE • LOS ANGELES

ROSS ENGINEERING OF CANADA, LIMITED, MONTREAL, CANADA • CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

MARBLES for MICROBES



Above—100,000X enlargement of latex spheres used to calibrate electron microscope in Nalco Laboratories. Actual diameter of spheres is 0.25 microns—.00000975 inches! *Right*—Inserting specimen holder in vacuum chamber of Nalco electron microscope.

. . . How they assist research toward better Water Treatment

PERHAPS even too small to make good marbles for microbes, these tiny spheres help Nalco Scientists in their investigations of the microscopic realms of matter only recently made visible to the human eye by the electron microscope.

Use of the electron microscope in water treatment research is significant because it typifies the continuing efforts of the entire Nalco organization to keep the Nalco System representative of the first and best in all phases of modern industrial water treatment.

If you are not already participating in the economy and efficiency of the Nalco System in your plant, write for details on real water treatment security today.

NATIONAL ALUMINATE CORPORATION
6232 West 66th Place • Chicago 38, Illinois

In Canada: Alchem Limited, Burlington, Ontario

THE *Nalco*®
SYSTEM . . . Serving Industry through Practical Applied Science

Nalco WATER TECHS

New reprint of A.S.M.E. Paper No. 52-A-30: *Experimental Studies of Boiler Tube Metal Temperatures: Effect of Heat Transfer Rate and Deposit Thickness*, gives technical data on high-heat-transfer-rate effects (140,000 to 300,000 Btu/sq. ft./hr.) at pressures from 250 to 2500 p.s.i. 16 pages, with tables and diagrams. Author: C. Jacklin, Director, Engineering Research, National Aluminate Corporation.

Your Copy Free Upon Request

The Paper Industry

Technology • Engineering • Management • Production

VOLUME 35 • NUMBER 1 • APRIL, 1953

Features . . .

Great Northern to increase East Millinocket production 35

Consolidated starts $500,000 liquor evaporating plant 39

Precast concrete sandwich panels used in B.C. mill 47

Great Northern manufactures newsprint from hardwood 54

New St. Regis mill in regular production 60

High-yield cold soda pulps and products from several woods 66
by K. J. Brown and J. N. McGovern

Progress in stream improvement. Part 2—Problems resulting from sulfate, semichemical and straw pulping and deinking 70
by Willis M. Van Horn

Job evaluation . . . job descriptions and job requirements 72
by J. A. Keller

Paper and paperboard making—XXVIII 73
by Harry Williamson

Use of radioisotopes in pulp and paper mills 75
by Leo Walter

Index to Volume Thirty-four of *The Paper Industry* 98

News . . .

News of the Industry 35

Association News 78

Names in the News 82

Necrology 85

Safety News 86

Departments . . .

Editorial 25

Current Comment 27

Financial Reports 28

Paper Sketches 77

Coming Events 81

Foreign Abstracts 88

New Products 91

New Literature 94

Current Market Quotations 102

Index to Advertisers 104

The PAPER INDUSTRY is indexed regularly in **Engineering Index** and **Industrial Arts Index.** An index to each volume is published annually by the publisher. The index to Volume 34 appears on pages 98 and 100 of this issue. Copyright 1953, by Fritz Publications, Inc.

Published monthly by:
FRITZ PUBLICATIONS, INC.
Edward B. Fritz (1869-1939), Founder

Publication Staff:

President and General Manager
A. SCOTT DOWD

Vice President and Treasurer
A. C. L. FRITZ

Secretary
A. C. BRUCE

Editorial Director
A. W. J. DYCK, Ph.D.

News Editor
D. W. ZEIGLER

Editorial Assistant
CAROL M. JOHNSON

Production Manager
EDGAR C. FARREN

Circulation Manager
STANLEY E. BOIE

Advertising Representatives:

BOSTON 16: Meade & Company, 471 Statler Building, Liberty 2-9677.

CHICAGO 5: John D. Henderson, 431 South Dearborn Street, Wabash 2-3543.

CLEVELAND: L. M. Perkins, 1199 Dorsh Road, South Euclid 21, Ohio, Evergreen 1-3232.

LOS ANGELES: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

NEW YORK 20: L. S. van Nydeck, 9 Rockefeller Plaza, Circle 7-3085.

NEW YORK 25: H. A. Johnston, 945 West End Avenue, Academy 2-6984.

PORTLAND: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

SAN FRANCISCO: Murray Bothwell, 234 East Colorado St., Pasadena, Calif., Ryan 1-9155.

SEATTLE 4: Arthur G. Neitz, 914 Second Avenue, Eliot 1769.

THE PAPER INDUSTRY—founded in 1919—known as "The Paper Industry and Paper World" from June, 1939, through December, 1949, assumed its original title with the January, 1950, issue.

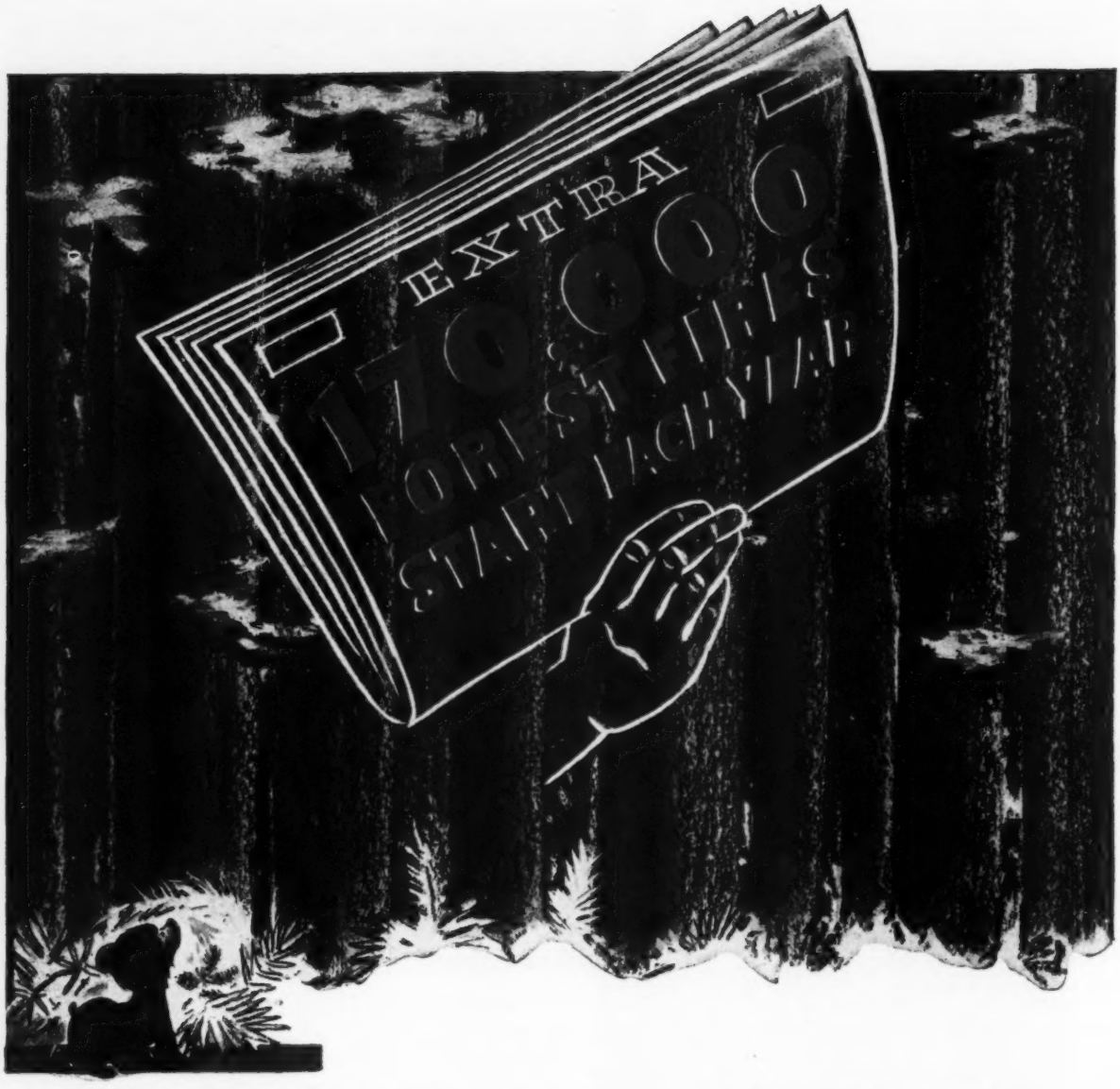
Published at 404 North Wesley Avenue, Mount Morris, Illinois.

Address all correspondence intended for publication to Editorial and Executive Office, 431 South Dearborn Street, Chicago 5, Illinois.

Member: Audit Bureau of Circulations, The Associated Business Publications.

Entered as second class matter December 13, 1948, at the post office at Mount Morris, Illinois, under the Act of March 3, 1879.

Subscription rates: United States, U. S. Possessions, and Canada, $3.00 for one year, $5.00 for two years, $6.00 for three years. All other countries, $8.00 for one year, $18.00 for three years, payable in advance in U. S. Funds.



At least 170 thousand forest fires start each year, burning more than 15,000,000 acres of timber land. Yet much of this shameful waste could be avoided, as nine out of ten forest fires are man-caused and preventable. Prevention of future fires down through the years is primarily a matter of organization and education.

The men and management of Weyerhaeuser Timber Company are keenly aware of the necessity of protecting forest lands from fire.

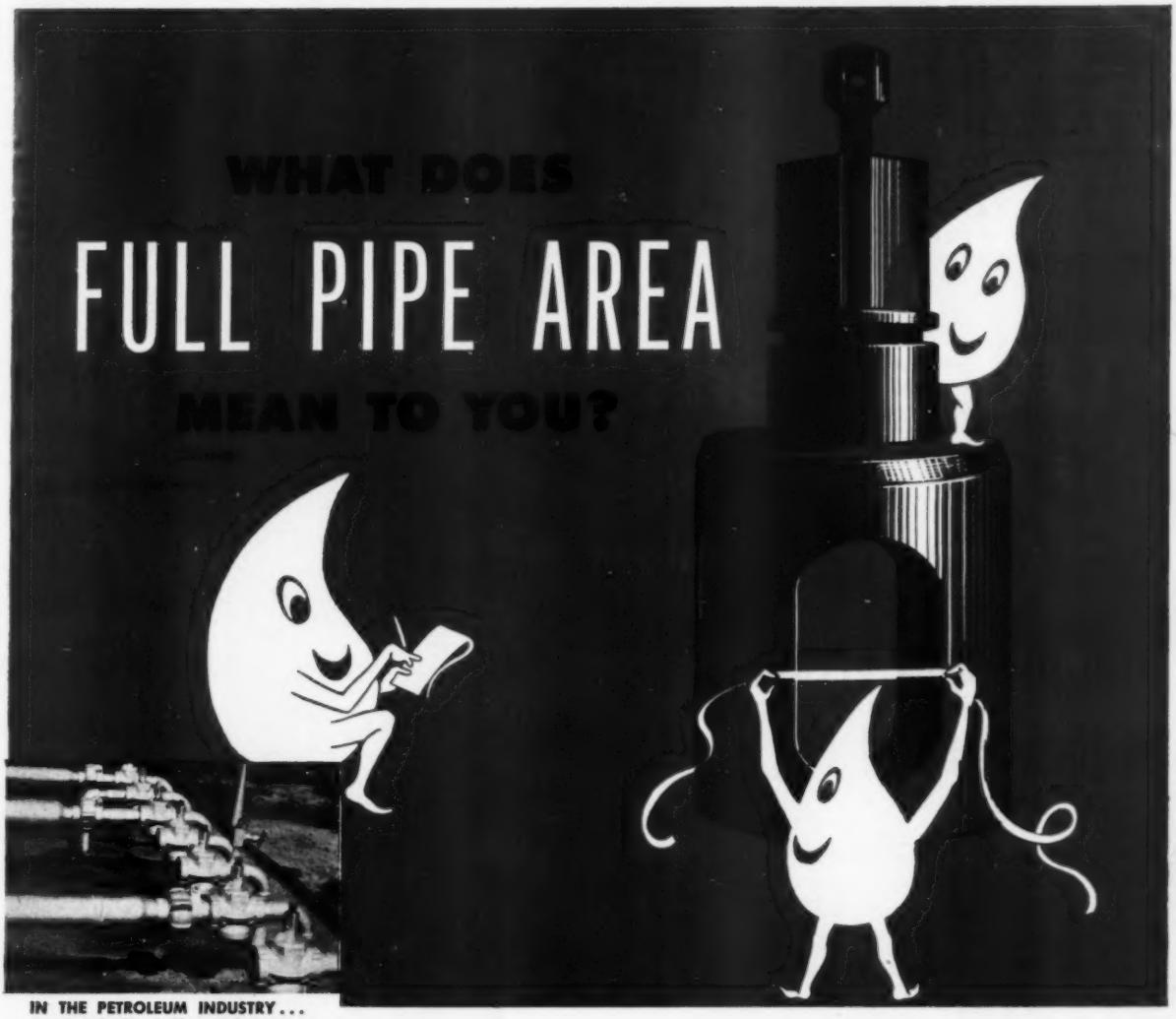
In the fall of 1941, Weyerhaeuser established the first officially designated "Tree Farm" at Montesano, Washington. Dedicated to the perpetual production of trees, Tree Farm rules require that adequate protective measures be instituted against fire, insects, and disease.

Today, all Weyerhaeuser Timber Company operating forest lands are tree farms, managed by skilled foresters. This tree farming system, wholeheartedly sponsored by Weyerhaeuser, guarantees the Pulp Division's customers an assured supply of woodpulp for the many years stretching ahead in the "cellulose age" in which we live.

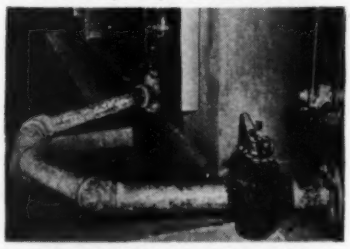
WHAT DOES

FULL PIPE AREA

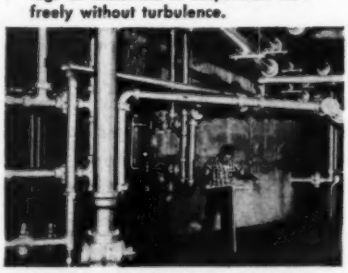
MEAN TO YOU?



IN THE PETROLEUM INDUSTRY . . . a.c.f. Cylindrical Plug Valves give full flow, quick quarter-turn shut-off.



ON CHEMICALS viscous heavy ladings or materials in suspension flow freely without turbulence.



IN SEWAGE PLANTS a.c.f. Cylindrical Plug Valves handle raw sewage with ease—plug shears obstructions.

It means, primarily, a smooth, straight-through flow. Look through an a.c.f. CYLINDRICAL Plug Valve, and you'll see why solids in suspension and heavy, viscous ladings pass so easily. There are no restrictions to retard flow! The valve port has an area at least as large as the pipe itself. For the lowest head loss of *any* plug valve in the world, specify a.c.f. CYLINDRICAL, Lubricated Plug Valves. You'll save time and pumping cost!

a.c.f. CYLINDRICAL FULL PIPE AREA PLUG VALVES

Write for Catalogue 4-PI, American Car and Foundry Co., Valve Division, 1501 E. Ferry Ave., Detroit 11, Mich.

Representatives in 50 Principal Cities

BECCO
HYDROGEN
PEROXIDE
AND OTHER
PEROXYGEN
CHEMICALS

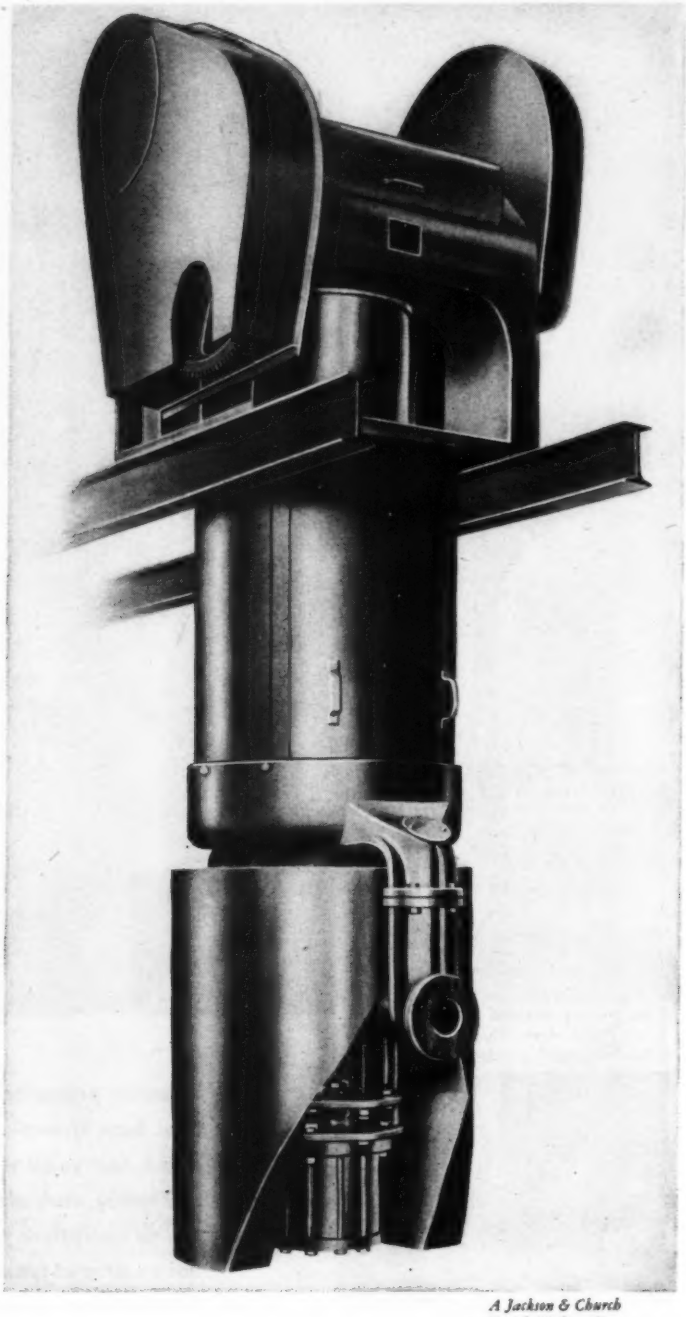
You Can Now Bleach Crumbs with Hydrogen Peroxide at High Density!

Continuous bleaching with Hydrogen Peroxide at 25%-40% density is now a reality for groundwood, semi-chemical, and chemical pulps in crumb form.
Semi-continuous steeping of these pulps without retention towers is also a commercial operation.
Screw presses will perform the function of de-watering to high densities.

The systems are characterized by their simplicity and low floor area requirements.

To obtain the same brightness level, chemical cost reductions due to high density operation (25%-40%) have been up to 20% for groundwood, up to 25% for neutral sulfite semi-chemical, and up to 45% for sulfite, compared with moderate density (10%-14%) systems.

For further information on the most efficient peroxide methods, write to Becco.



A Jackson & Church Zenith Medium Press typical for use in de-watering high density pulp crumbs.

Buffalo Electro-Chemical Company, Inc.

fmc DIVISION OF FOOD MACHINERY AND CHEMICAL CORPORATION

Sales Agent: BECCO SALES CORPORATION, Station B, Buffalo 7, N.Y. • Buffalo • Boston • Charlotte • Chicago • New York • Philadelphia • Vancouver, Wash.

Electronic spacer patterns guide stockpile through sequence of cuts automatically. Responsive Oilgear Transmission provides speedy travel with pin-point stopping within 3/1000ths of an inch from zero tolerance. Lawson Cutter also used in repetitive single cuts and for trim on sides. Photo in plant of Liedtke Brothers, Chicago.

The RESULT?

Accuracy just 900% better

Production increase 50 to 500%

Over and over and over again, Oilgear Fluid Power proves to be the right solution to a drive problem. Take the case of the Lawson Cutter.

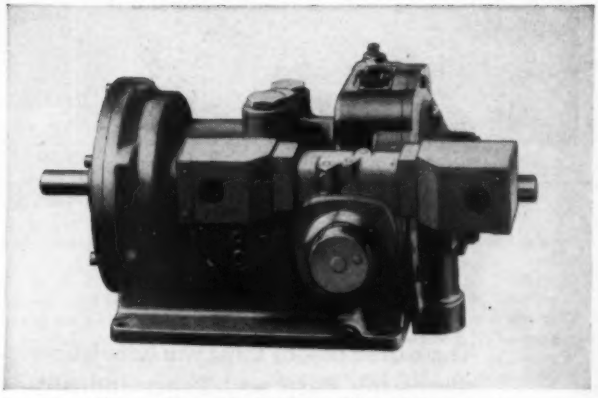
If precision is emphasized anywhere, that "where" is the field of fine color printing of every description. Money, time, effort are spent that art be right, that plates be right, that printing be right—to a hairline. And then comes the cutting operation where all that has gone before is saved—or wasted. Small wonder that cutting remained a hand operation for many years.

But the E. P. Lawson Company, manufacturer of cutting machines, wanted to modernize and mechanize the operation. Its designers turned to an electronic spacer device. This if anything would give precision in marking *where* to cut. But the next problem was to find a power drive capable of *obeying* the orders the electronic signal system was capable of *giving*. Lawson tried one type of drive. It varied all over the map. Lawson tried another type of drive. It was fairly accurate —but did not hold up.

Finally, as so many machine designers have done, Lawson turned to Oilgear. And there, as so many machine designers have done, Lawson found the answer to its problem.

The answer? Undeviating accuracy within 3/1000ths of an inch from zero tolerance—just 900% better than what had been achieved in the past; speed, translating into production increases of 50% to 500% month in and month out. How? Through the absolute responsiveness of Oilgear Fluid Power Drive to the automatic control system. Immediate, shockless acceleration to full speed "forward". Precise measured slowdown as the feed fence nears the target. Precision stopping "on target" for the cut and then rapid acceleration toward the next cut.

Here again is an example of the superlative "right-



Oilgear Two way Variable Speed Transmission as used on Lawson Electronic Spacer Cutters. These drives also provide unlimited speed range from zero to maximum. Speed changes made in split second or specified time.

ness" of Oilgear Fluid Power "generators," motors, transmissions—for almost any type of installation or machine requirement, big, little, and all those in between.

Chances are Oilgear is *the* solution you've been looking for. And Oilgear engineers will be just as quick to tell you if Oilgear is *not* for you. Ask for further information from an Oilgear Engineering Representative. No charge. No obligation. THE OILGEAR COMPANY, 1578 W. Pierce St., Milwaukee 4, Wisconsin.

OILGEAR

OILGEAR

PIONEERS...NOW THREE PLANTS FOR FLUID POWER

MUSCLES for your PULPWOOD HANDLING

JEFFREY EQUIPMENT MOVES IT!

General view at the right shows a system of Jeffrey Chain Conveyors handling logs to and from barking drums at a large pulpwood processing plant.

This Steel Apron Conveyor delivers logs to grinders. Other types of Jeffrey Conveyors are available to handle individual problems in processing.

Pulpwood sorting room with three Jeffrey Conveyors. A Flat Belt Conveyor above carries logs to the chippers. A Chain Conveyor delivers logs to the grinders. A second Chain Conveyor returns logs to the drums.

These illustrations show you how Jeffrey serves the Pulp and Paper industry through all stages of preparation. Jeffrey equipment includes Bucket Elevators; Belt, Chain and Spiral Conveyors; Feeders; Re-Chippers; Screenings Grinders; Bark Shredders; Salt-cake Crushers.

Nearly every plant presents a different problem. Your plant merits the best engineering service. Jeffrey engineers have the experience and Jeffrey equipment is most complete in providing you maximum efficiency and economy in pulpwood handling.

Call a Jeffrey Engineer for further information.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

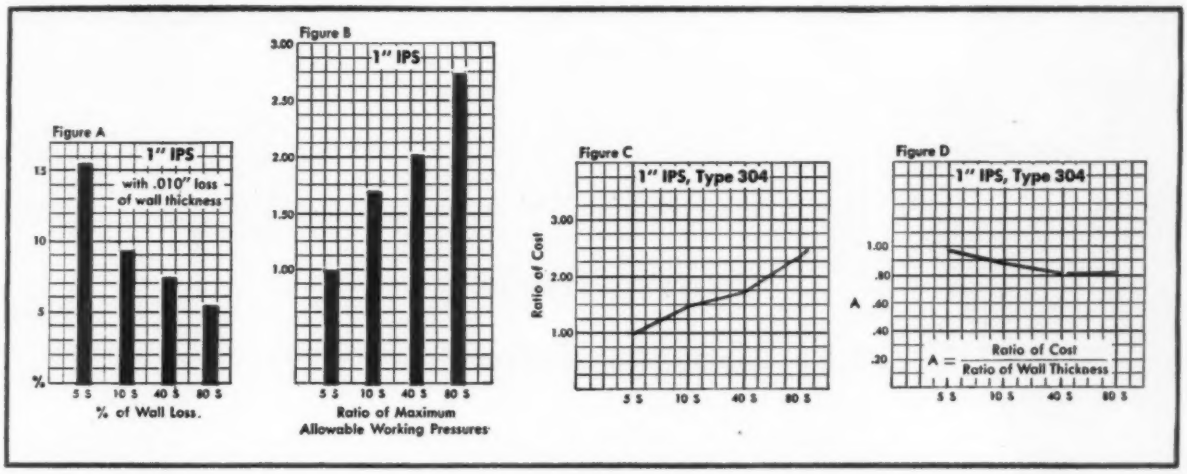
PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

take a closer look at

Stainless STEEL PIPE SIZE Schedules

Don't be "penny wise and pound foolish" where stainless steel piping is concerned. The most economical choice does not always imply the least initial cost as working pressure, methods of joining, installation costs and allowance for loss by corrosion are critical factors. This is particularly true where costs resulting from failures in service—replacement of equipment and lost production due to down time—may exceed the initial cost of the piping.



CORROSION RESISTANCE

For long service life it is advisable to allow for some loss in wall thickness where stainless piping is employed to combat severe corrosion. As shown in Figure A even a small loss means an appreciable percentage loss of wall thickness in the lighter weight schedules.

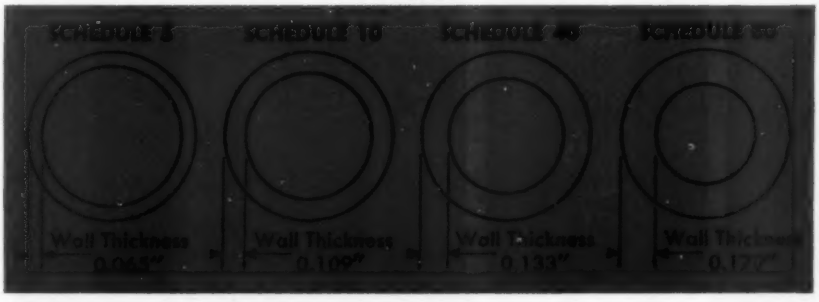
WORKING PRESSURES

As shown in Figure B, the heavier pipe schedules permit higher working pressures, thus perhaps permitting the use of smaller diameter piping, or offering greater flexibility for subsequent changes in operational procedures.

COSTS

Although the lighter schedules cost less, as shown in Figure C, you actually get more for your money with the heavier schedules because the ratio of increase in cost is *less* than the ratio of increase of wall thickness (Figure D).

1" IPS



Methods of Joining & Installation Costs

From the standpoints of economy and ease of installation, it is extremely important that attention be given to methods of joining, fittings, etc. because:

1. Schedule 40 IPS is the lightest weight pipe specifically designed for threading.
2. Fittings which provide a good thread and also afford structural strength at the joint are not commercially available for lighter weight pipe.
3. Field welding of thin wall pipe is difficult.
4. Misalignment of connections can cause high installation costs.

While various types of fittings are available for the lighter weight pipe schedules, they should be examined carefully as to initial cost, installation cost, working pressure permitted and ease of adaptation to existing lines.

Whatever your stainless piping problems, Mr. Tubes—your B&W Tube representative—can provide valuable assistance. Consult him for advice on the stainless piping or tubing that will afford optimum cost-life ratio under your service conditions.

TA-1709 (G)

B&W SEAMLESS and WELDED TUBES

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

Appleton Felts

FOR

design

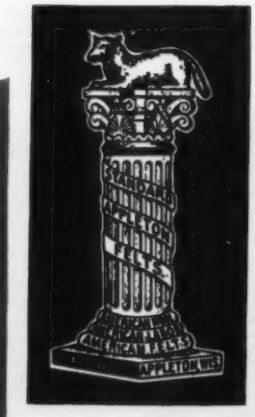
finish

service

dependability

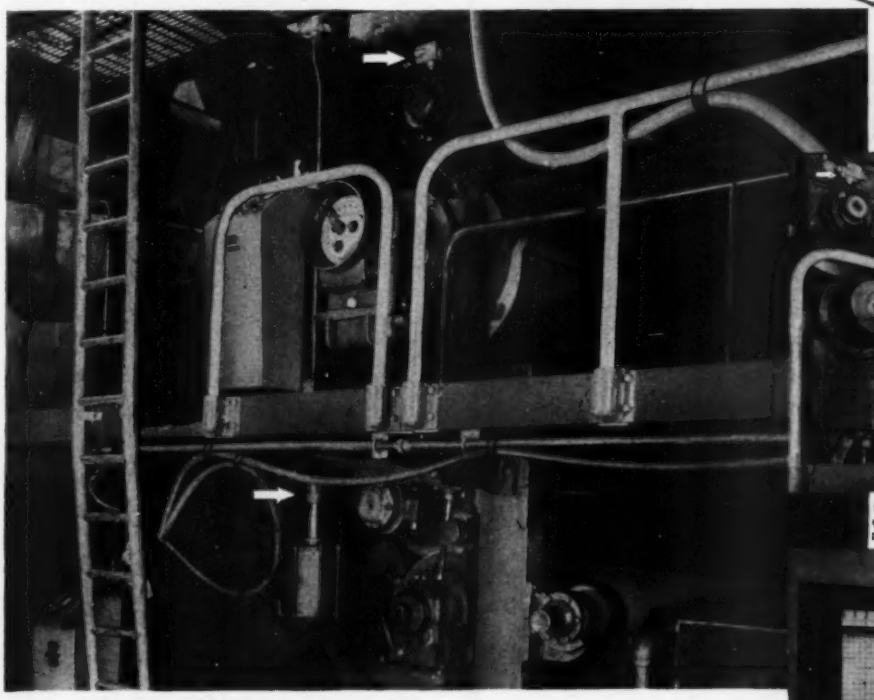
uniformity

APPLETON WOOLEN MILLS APPLETON WISCONSIN

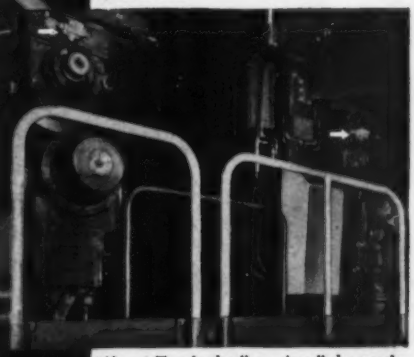


THE KEY TO ACCURATE CONTROLLING AND RECORDING OF ROLL PRESSURES

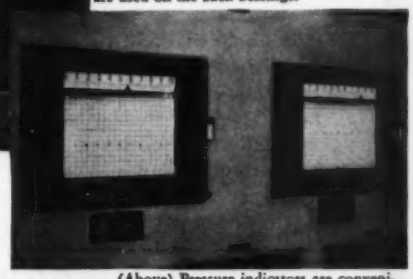
Downingtown Load Meters



(Left) Close up view of a Downingtown Suction Drum Press with load cells indicated by arrows. Cells are mounted between top arm and bearing housings. Similar cells are installed on back bearings. Lower Suction Extractor has load cell connected in air cylinder rod.



(Above) Two load cells are installed on each of the rolls indicated by arrows. Identical cells are used on the back bearings.



(Above) Pressure indicators are conveniently located near control panels but can be placed anywhere in the building. Provision can be made to accommodate future load cell installations.

More and more paper and board manufacturers are turning to Downingtown Load Meters for indicating, recording or automatic control of pressure and tension. While the installation shown here consists of Load Meters, on a paper machine wet end, they are being used to control pressure wherever it exists between two rolls and also to indicate wire tension. They may also be used to record felt tension and other applications where loading and tension are factors. In the particular section illustrated here, twenty-six load cells are used.

The advantages of automatically indicating, controlling and recording roll pressures are fairly obvious. But the great advantage of using Downingtown Load Meters is in their simplicity of operation and installation . . . their freedom of influence from mechanical maladjustments, temperature and moisture . . . and their flexibility which allows installations to meet any variety of mill conditions.

A Downingtown bulletin is available which describes the Load Meter and its operation in detail. Write for it or consult your Downingtown Sales Representative.

DOWNINGTOWN MANUFACTURING CO.
DOWNINGTOWN, PA.

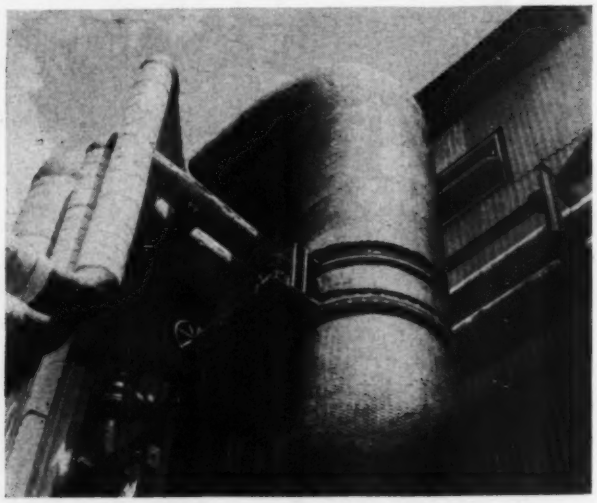
West Coast Representative:
John V. Roslund, Pacific Building
Portland 4, Oregon

DOWNINGTOWN
LOAD METERS
MODERNIZATION IS PROFITABLE

DESIGNERS AND BUILDERS OF PAPER, BOARD AND FELT MACHINES SINCE 1880

R-S valvEvents

• EXCERPTS FROM THE R-S BOOK OF EXPERIENCE •



R-S VALVES
OPERATE EASILY
Above or Below Floor Level

Because of their comparative light weight and minimum space requirements, R-S Valves are particularly well adapted for installation at considerable heights above the floor level. In such positions they are usually operated manually by chainlever, chainwheel, extended reach rod or controlled automatically.

Where the valve must be installed in an inaccessible position below the floor level, a floor stand is provided. Control is just as quick and uniform as in those installations where the handwheel is mounted directly on the valve shaft.

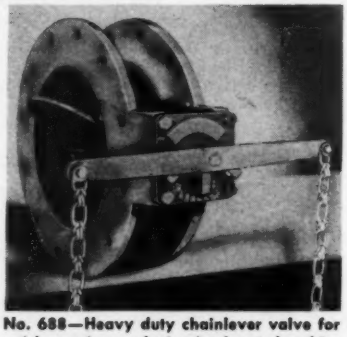
Simplicity of design, the wide range of application and ease of operation indicate the high order of metallurgical and mechanical engineering that is embodied in every R-S Valve.

Consult your local R-S Valve Engineers, or write direct.

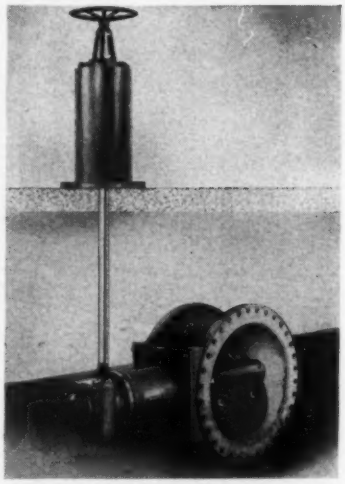
R-S PRODUCTS CORPORATION
4600 Germantown Avenue, Philadelphia 44, Pa.

An S. Morgan Smith Company Subsidiary

DISTRICT OFFICES IN PRINCIPAL CITIES

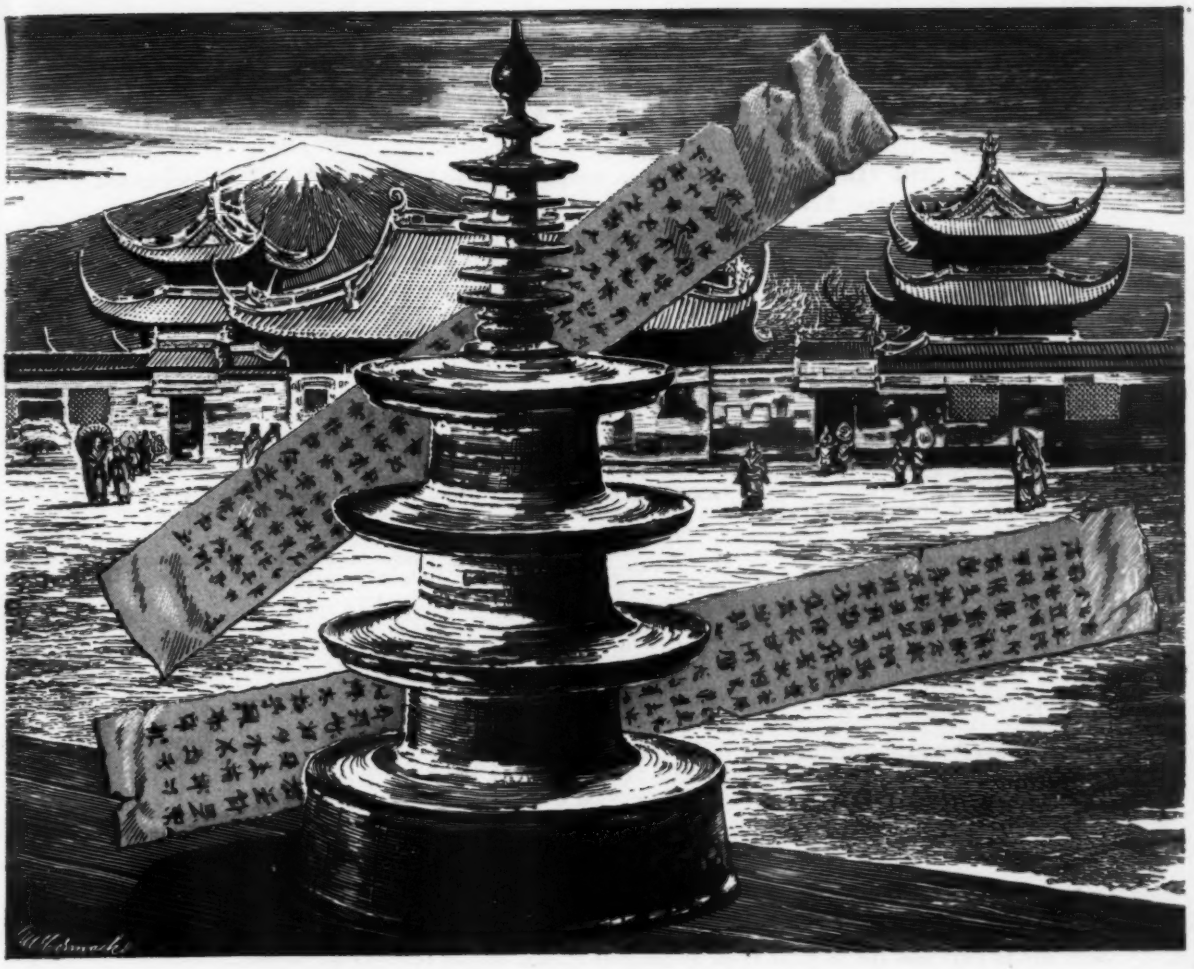


No. 688—Heavy duty chainlever valve for quick opening or closing in elevated and inaccessible locations. R-S Valves are used to control and shut-off the volume and pressure of nearly all materials in the temperature range from minus 300° to plus 2000° F. 2 to 2500 psig.



No. 788—Heavy duty valve equipped with rubber seat, totally enclosed gear reduction drive, extended shaft and floor stand. Positive shut-off is obtained up to 125 psig with rubber seated valves and commercially tight shut-off to even higher pressures with a babbitted seat.

No. 839—8-inch heavy duty valve equipped with 125-pound flanges, 18-8 shafts, bronze bushings and a throttling type motor operator for the control of low pressure air.



How a Smallpox Epidemic Started the First Mass Production of Paper!

In A. D. 735 a smallpox epidemic struck Japan. To drive out the "evil spirits" believed to have been the cause of the disease, Empress Shotoku sanctioned the printing of a million paper prayers. Each prayer was to be enshrined within an ornate wooden pagoda eight inches high and approximately four inches in diameter at the base. Requiring six years to complete, the project led to the first large-scale production of paper and to the world's first text printing upon sheets of paper. Just as this event contributed to the progress of paper-making, A. E. Staley Manufacturing Company promotes progress in modern papermaking by supplying high-grade raw materials to the nation's leading mills. Contact your supplier or write direct for details.

QUALITY STALEY® PRODUCTS FOR PAPER MAKERS

Staley Sizing Starches
A full range of starches and dextrins for beater, surface or calender sizing.

Staley Corrugating and Laminating Adhesives
Finer corrugating starches, special laminating and bag adhesives.

Staley Coating Adhesives
Starches and dextrins give better results for machine or brush coating.

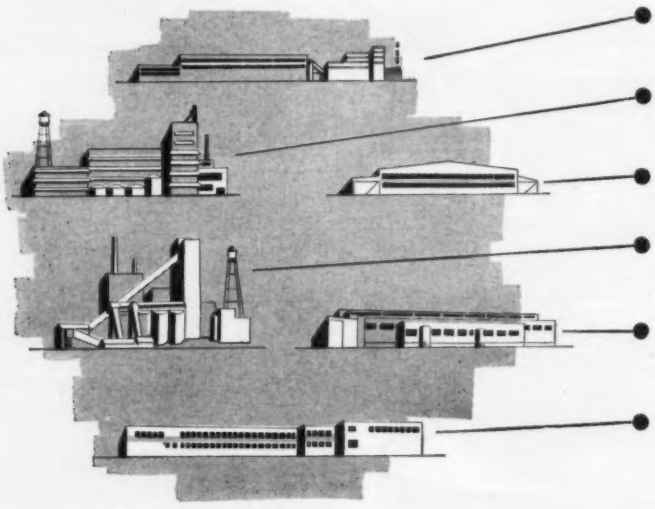
Staley Plasticizers
"Sweetose" and Staley's corn syrup are ideal softening agents for glassine paper.

PRODUCTS FROM CORN
Staley's

A. E. Staley Mfg. Company, Decatur, Ill.

ST. REGIS REPORTS FOR 1952

THE YEAR 1952 saw the virtual completion of an 8-year expansion and improvement program. For this program St. Regis Paper Company expended $134,333,316. At the end of the year, the following major projects were substantially completed and in operation:



- Completion of the new Jacksonville, Florida, kraft pulp, paper and board mill.
- Expansion of the Pensacola, Florida, kraft pulp, paper and board mill.
- Enlargement of the Pensacola, Florida, multiwall bag plant.
- Completion of Tacoma, Washington, pulp mill expansion.
- Completion of the new multiwall bag plant at Tacoma, Washington.
- Completion of the new multiwall bag plant at Dryden, Ontario.

ST. REGIS PAPER COMPANY paid dividends of $1.00 per share of common stock in 1952, as compared with 80¢ in 1951 and 70¢ in 1950. Copy of complete Annual Report available on request.

SUMMARY OF CONSOLIDATED INCOME	*For the years ended December 31, 1952 and 1951* 1952	1951
Net Sales	$182,712,239	$195,955,617
Cost of Sales and Expenses	158,165,799	159,845,270
Operating Income	24,546,440	36,110,347
Income Credits	2,561,466	3,757,159
Gross Income	27,107,906	39,867,506
Income Charges	2,867,531	1,126,663
Profit Before Taxes	24,240,375	38,740,843
Provision for Federal and Foreign Taxes	11,538,398	21,944,809
Net Income	12,701,977	16,796,034
Dividends Paid		
Preferred Stock	$ 693,308	$ 708,193
Common Stock	5,170,714	4,136,531
Net Income Per Share of Common Stock	2.32	3.11

ST. REGIS PAPER COMPANY

230 Park Avenue New York 17, N. Y.

In Canada: St. Regis Paper Company (Canada) Limited, Montreal

Products include a wide range of printing, publication and converting papers—bleached and unbleached kraft paper and board—bleached sulphate pulp—multiwall bags and packers—industrial and decorative laminated plastics

MIDWEST

The Only Change is in the Name

MIDWEST PIPING & SUPPLY CO., INC.
has Changed its Name to

Midwest Piping Company, Inc.

6283

Because the word "Supply" is no longer accurately descriptive of the major business operations of this company, the stockholders have voted to drop it from the corporate name.

There has been no change in management, ownership or business at Midwest . . . and none is contemplated. Only the name has been changed. Midwest continues all its activities in the fabrication and installation of piping, and in the manufacture of welding fittings.

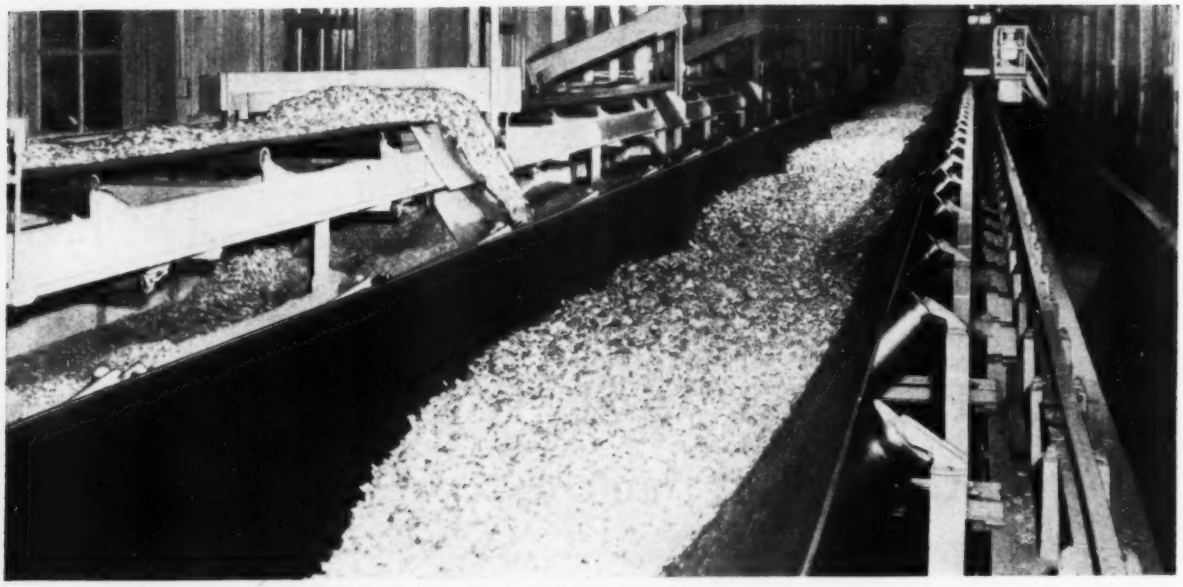
MIDWEST PIPING COMPANY, INC.

Executive Offices: 1450 South Second St., St. Louis 4, Mo.

Plants: ST. LOUIS, PASSAIC, LOS ANGELES and BOSTON

Sales Offices: NEW YORK 7—50 CHURCH ST. • TULSA 3—224 WRIGHT BLDG.
CHICAGO 3—79 WEST MONROE ST. • LOS ANGELES 33—520 ANDERSON ST.
HOUSTON 2—1213 CAPITOL AVE. • BOSTON 27—426 FIRST ST.

PIPING FABRICATORS AND CONTRACTORS FOR MORE THAN 50 YEARS
MANUFACTURERS OF WELDING FITTINGS FOR MORE THAN 20 YEARS



With Link-Belt 45° roller bearing idlers increasing its capacity as much as 60%, this 6-ft. wide belt conveyor easily transports chips to storage silos.

TOTAL ENGINEERING

It's LINK-BELT's answer for improved belt conveyor performance

BELT conveyor efficiency begins with correct analysis of overall system requirements. And right from the start Link-Belt offers you unique advantages. Our engineers can apply broad experience to your bulk handling problems.

Working with a complete line of quality components, they can select the belt conveyor equipment best suited to your exact needs. What's more, Link-Belt has a nation-wide engineering organization that will follow through on every detail. This includes supplying all related equipment . . . building supporting structures and enclosures . . . erecting the complete job, if desired.

It's easy to see why "total engineering" results in top belt conveyor performance. For complete information, call the Link-Belt office near you today.

13,131-A

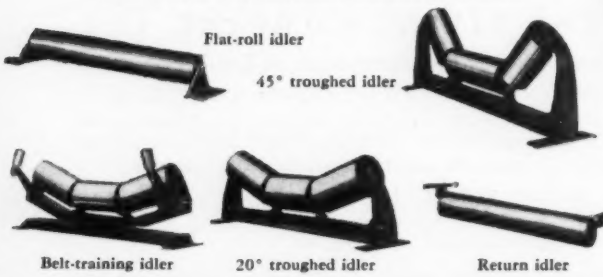
LINK-BELT

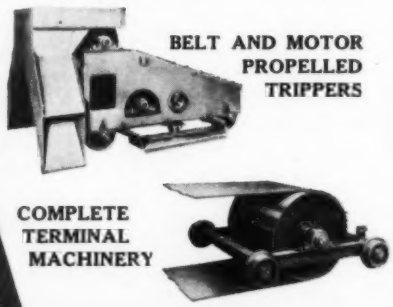
BELT CONVEYOR EQUIPMENT

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices in Principal Cities.

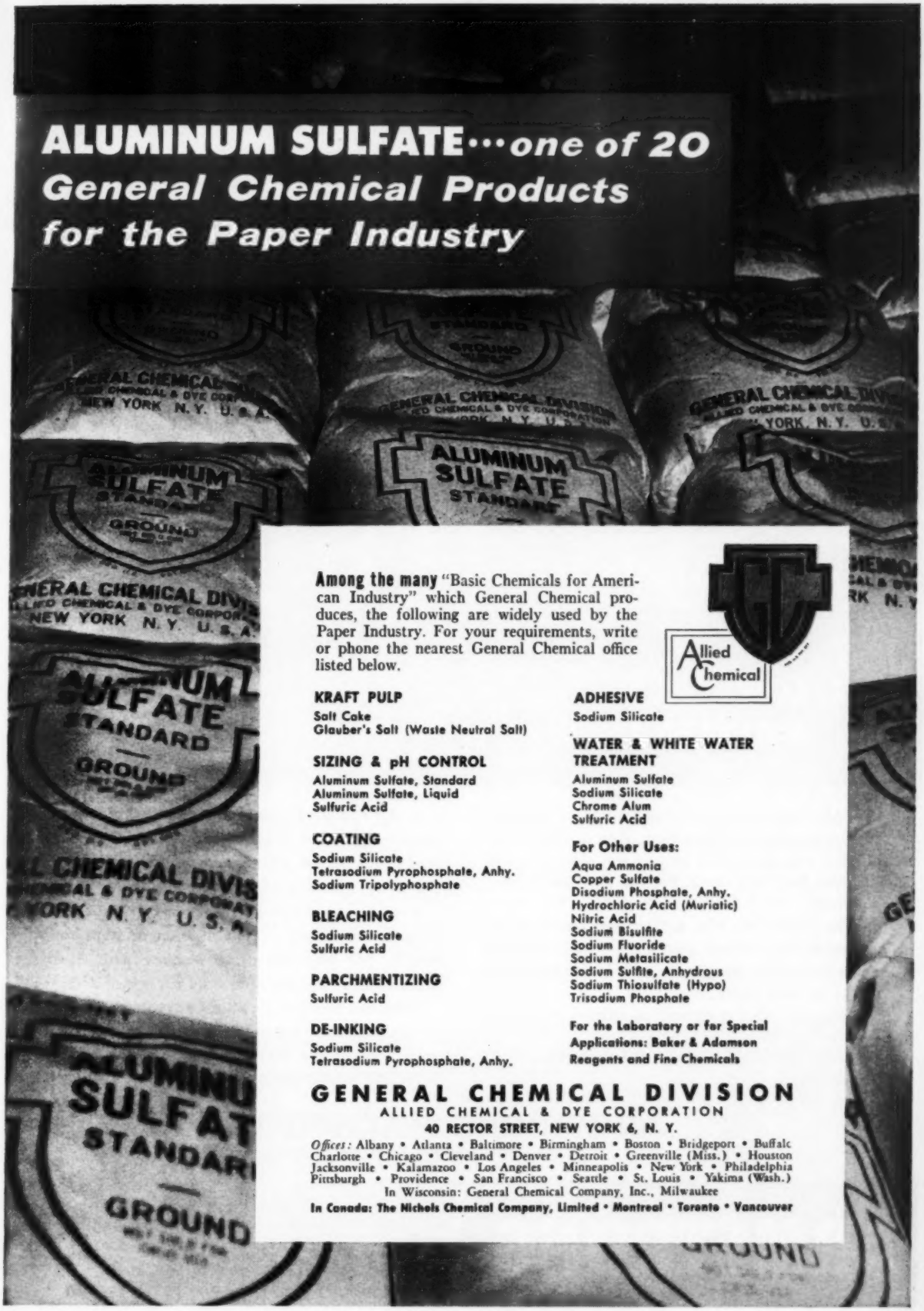
LINK-BELT builds a complete line of belt conveyor components

ALL TYPES OF ROLLER BEARING IDLERS





ALUMINUM SULFATE···*one of 20*
General Chemical Products for the Paper Industry



Among the many "Basic Chemicals for American Industry" which General Chemical produces, the following are widely used by the Paper Industry. For your requirements, write or phone the nearest General Chemical office listed below.

Allied Chemical

KRAFT PULP
Salt Cake
Glauber's Salt (Waste Neutral Salt)

SIZING & pH CONTROL
Aluminum Sulfate, Standard
Aluminum Sulfate, Liquid
Sulfuric Acid

COATING
Sodium Silicate
Tetrasodium Pyrophosphate, Anhy.
Sodium Tripolyphosphate

BLEACHING
Sodium Silicate
Sulfuric Acid

PARCHMENTIZING
Sulfuric Acid

DE-INKING
Sodium Silicate
Tetrasodium Pyrophosphate, Anhy.

ADHESIVE
Sodium Silicate

WATER & WHITE WATER TREATMENT
Aluminum Sulfate
Sodium Silicate
Chrome Alum
Sulfuric Acid

For Other Uses:
Aqua Ammonia
Copper Sulfate
Disodium Phosphate, Anhy.
Hydrochloric Acid (Muriatic)
Nitric Acid
Sodium Bisulfite
Sodium Fluoride
Sodium Metasilicate
Sodium Sulfite, Anhydrous
Sodium Thiosulfate (Hypo)
Trisodium Phosphate

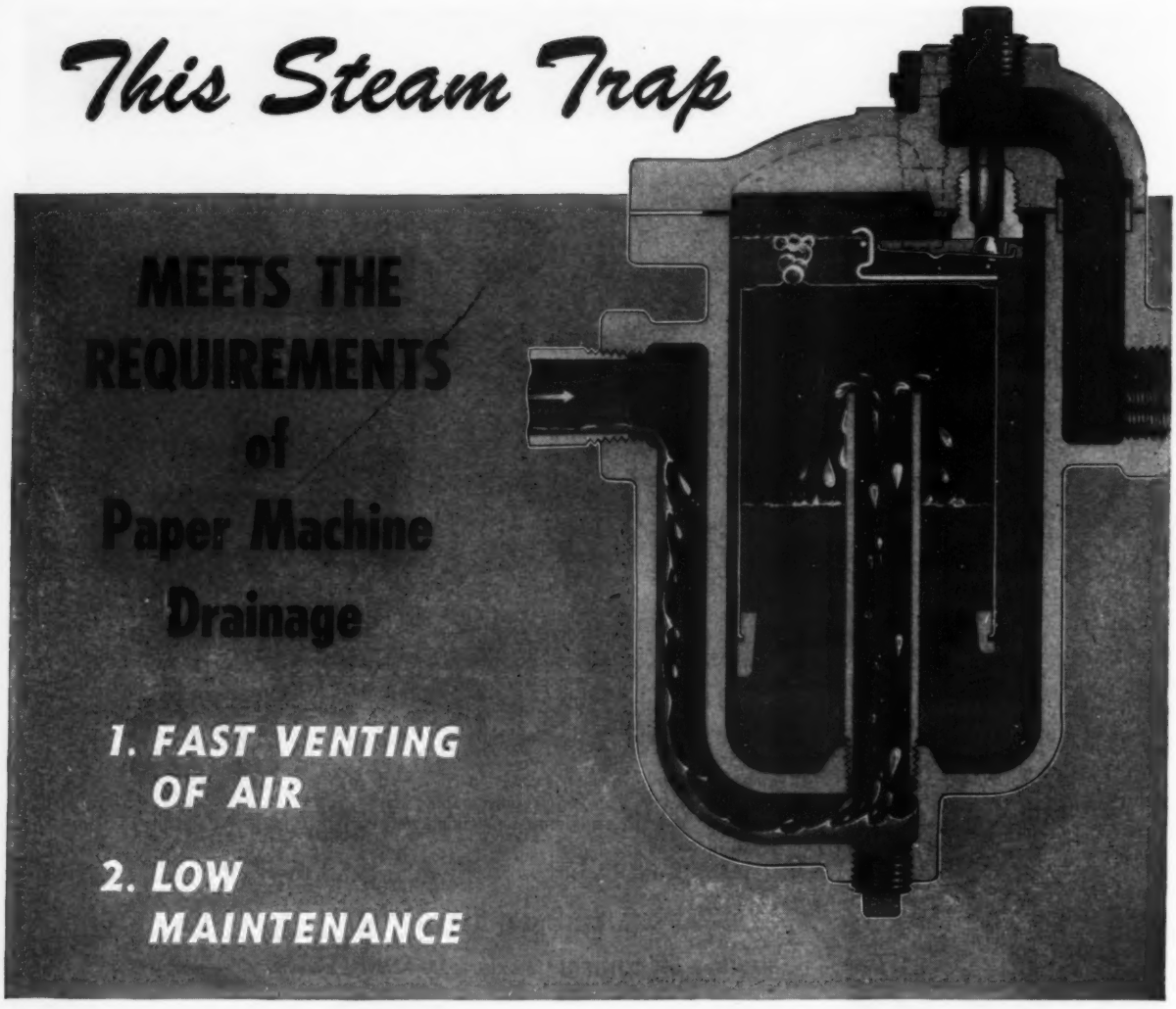
For the Laboratory or for Special Applications: Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cleveland • Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis • Yakima (Wash.)
In Wisconsin: General Chemical Company, Inc., Milwaukee
In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

DETROIT PUBLIC LIBRARY

This Steam Trap



STEAM traps haven't always worked so well for draining paper machines. First, they wouldn't vent air fast enough, so that heat-up was slow after the machine had been down. Second, they didn't wear too well.

The Armstrong No. 813D steam trap was designed to answer these objections. That it does has been proved by many mills with individual 813D traps on each dryer.

Large air venting capacity is secured with oversize bucket vents.

Long life with infrequent maintenance has been secured by:

1. An extended inlet tube which admits condensate, steam and air into the trap above the water level in the bucket. This eliminates excessive wear-producing agitation of the mechanism.

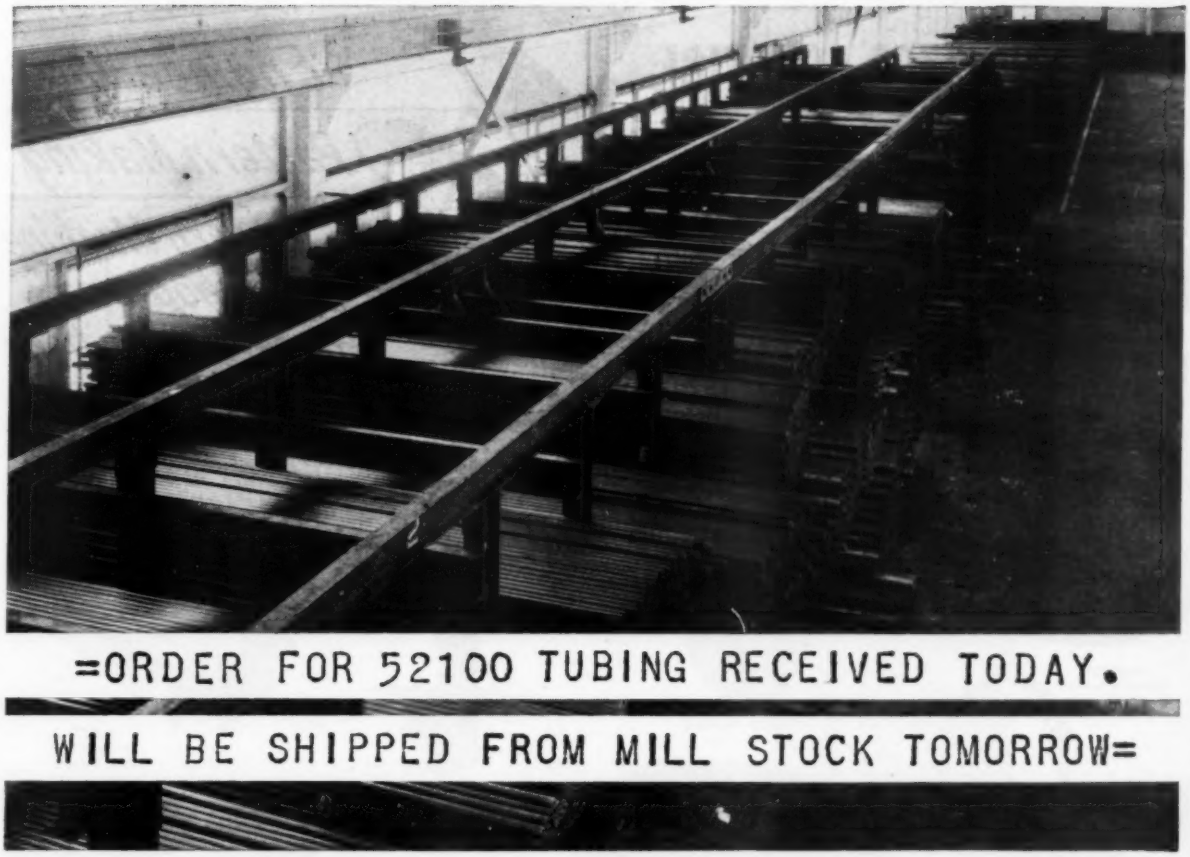
2. Chrome steel valve and seat — hardened, ground and lapped — same as used in traps for 900°F., 950 psig. All other working parts 18-8 stainless steel, heavily reinforced for wear.

With this trap you get all the advantages of simplicity, economy, dependability and fast drainage with none of the previous disadvantages. SEND FOR BULLETIN No. 205.

ARMSTRONG MACHINE WORKS
816 Hoffman Street, Three Rivers, Michigan

ARMSTRONG

Moisture Control Systems
Individual Dryer Temperature Controls
Paper Machine Drainage Traps
Inverted Bucket Steam Traps
Steam Humidifiers



ORDER wear-resistant 52100 tubing today. We ship it tomorrow from our mill stock of one hundred and one sizes!

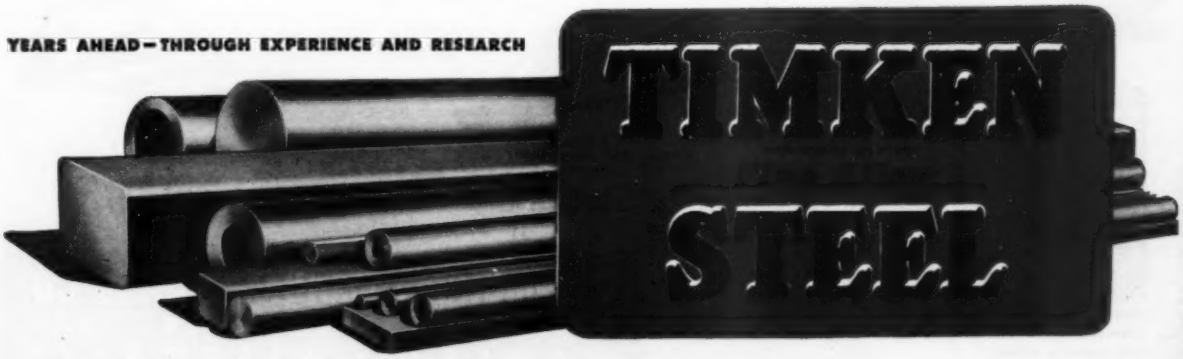
A high-carbon chrome steel, 52100 manufactured by the Timken Company, is through-hardening in moderate sections and can often be used in place of more expensive steels.

It can be heat treated to file hardness and tempered back to any desired point. And it's available in sizes from 1″ to 10½″ O.D., to fill many of your hollow parts needs: aircraft parts, ball bearing races, pump parts and plungers, collets, bushings, spindles, grinding machine parts and precision instrument parts.

As America's first producer of 52100 tubing, the Timken Company has unequalled experience that results in uniform high quality from tube to tube and order to order. Rigid quality control checks every step of production.

For immediate delivery of your less-than-mill-quantity orders, write, wire or call The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

A SPECIALIZED SERVICE *to the* PAPER INDUSTRY

BACKED BY OVER 70 YEARS EXPERIENCE

Engineering-

Pattern Making

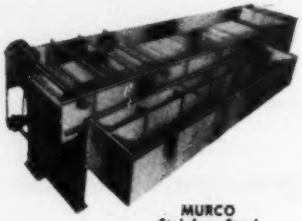
Modern Machine Shop and Foundry Operations

To the paper industry we offer a specialized service including engineering, pattern making, modern machine shop facilities and foundry operations — all top quality because of our over 70 years' close association with the needs of paper manufacturers. No obligation for complete details and engineering recommendations.

MURCO Multiple Knife Wood Chipper

MURCO Multiple Knife Discs

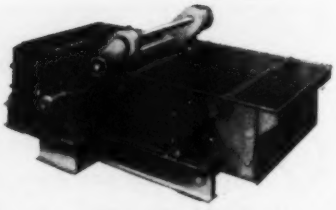
MURCO Knot Drill



MURCO Stainless Steel Flat Screen

MURCO Portable Wood Chipper

MURCO Barking Drum



MURCO Level Vibrating Double Deck Chip Screen

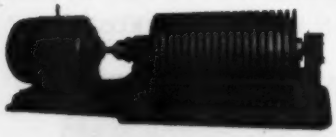
MURCO-Adams-Clark Portable Barker

MURCO Rechipper

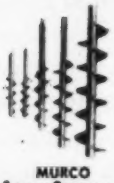
MURCO Quick Opening Gate Valves

MURCO Stainless Steel Pipes and Fittings

MURCO Pulp Wood Slasher

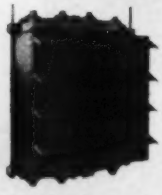


MURCO Chip Crusher



MURCO Screw Conveyors and Flights

MURCO Roll Heading Machine



Grid UNIT HEATERS AND BLAST COILS

For heating, drying and processing equipment, GRID cast iron construction assures trouble-free service . . . one piece construction high test cast iron heating sections . . . no soldered, brazed or welded sections . . . no electrolysis to cause corrosions, breakdowns, leaks or heating failures . . . may be used on steam pressures up to 250 lbs. Send for catalog, engineering data and capacity tables.

MURCO Hydraulic Roll Lowering Table

MURCO Collard Windershafts

D. J. MURRAY MANUFACTURING CO.

MANUFACTURERS SINCE 1883

WAUSAU • WISCONSIN

Regulate surface density precisely, effectively

KELSIZE or one of the KELGINS

Superior Surface Control Agents

These hydrophilic colloids effectively regulate surface density when applied as a 0.20% to 3.5% solution from calender stack or size press, and effectively control penetration of adhesives, starch solutions, or any water base solution.

You secure these important advantages: Uniformly smooth finish—Uniform density • Improved Gloss and Flat Ink Printing • Greater Wax and Oil Resistance • Smoother and More Uniform Coating Base.

Kelsize® and **Kelgin®** products of **KELCO** company

20 N. Wacker Drive
Chicago 6, Ill.

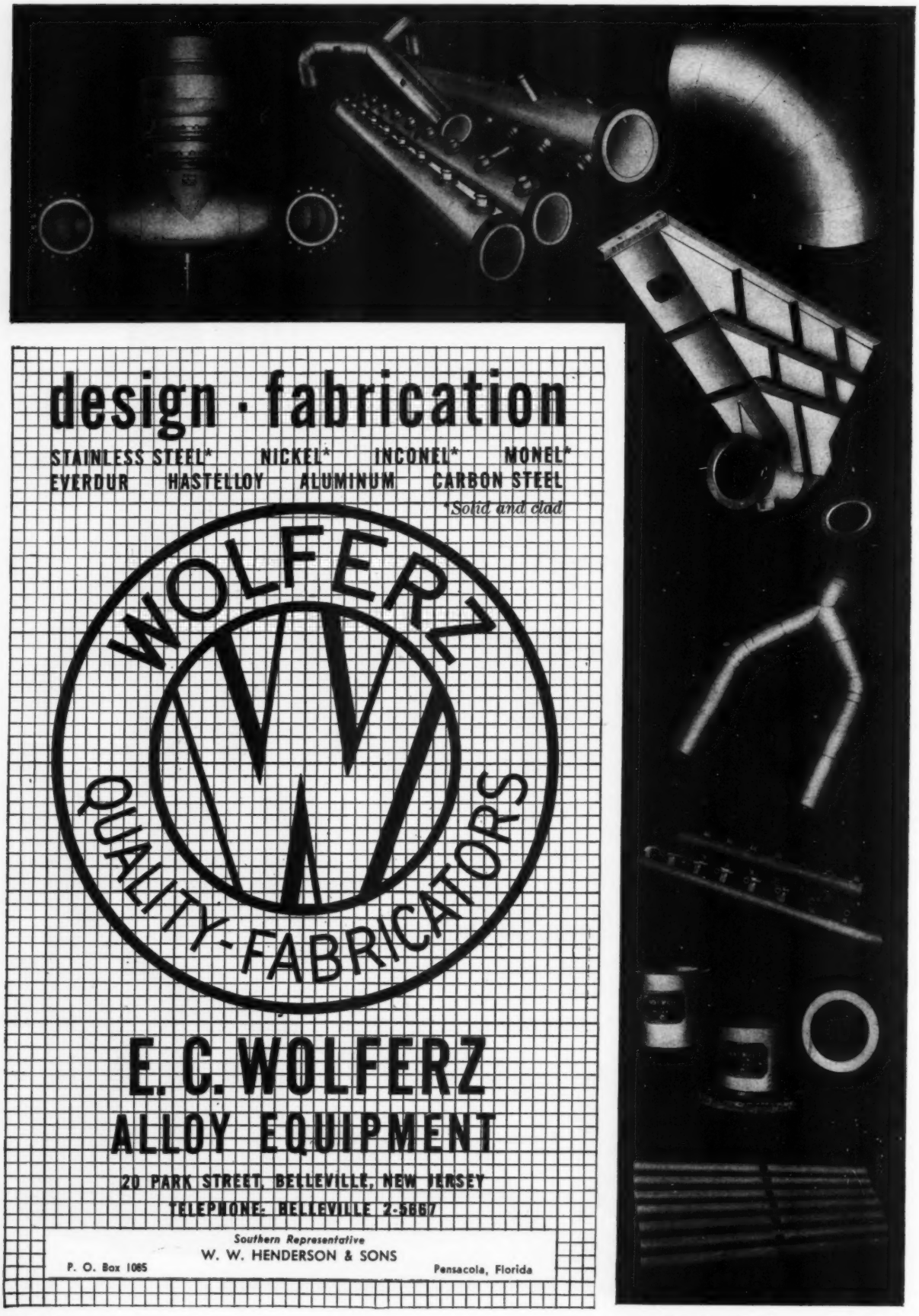
31 Nassau Street
New York 5, N. Y.

530 W. Sixth Street
Los Angeles 14, Calif.

Try Kelsize [illegible] **and**

Measure the difference!

Picture of Gurley Densometer • Courtesy of W. & L. E. Gurley


design · fabrication
STAINLESS STEEL* NICKEL* INCONEL* MONEL*
EVERDUR HASTELLOY ALUMINUM CARBON STEEL
*Solid and clad
WOLFERZ
QUALITY-FABRICATORS
E. C. WOLFERZ
ALLOY EQUIPMENT
20 PARK STREET, BELLEVILLE, NEW JERSEY
TELEPHONE: BELLEVILLE 2-5867
Southern Representative
W. W. HENDERSON & SONS
P. O. Box 1085
Pensacola, Florida

Plus 10% increase in production

That's the record of a 3-machine Mexican Mill,* after installing the Jones equipment shown in the flow-chart above.

Three Jones High-Speed Refiners and one Standard Jordan replaced two 250-h.p. refiners and two 150-h.p. Jordans when this mill modernized the stock preparation for its largest paper machine — making about 20 t.p.d. of sulphite bonds and 12 to 14 t.p.d. of manifold papers.

The new installation has increased production by 10% while producing equal or better quality papers. Why don't *you* find out what the Jones High-Speed Refiner can do for your cost and quality controls? Ask your Jones representative or write direct for Bulletin EDJ-1011B.

*Name on request

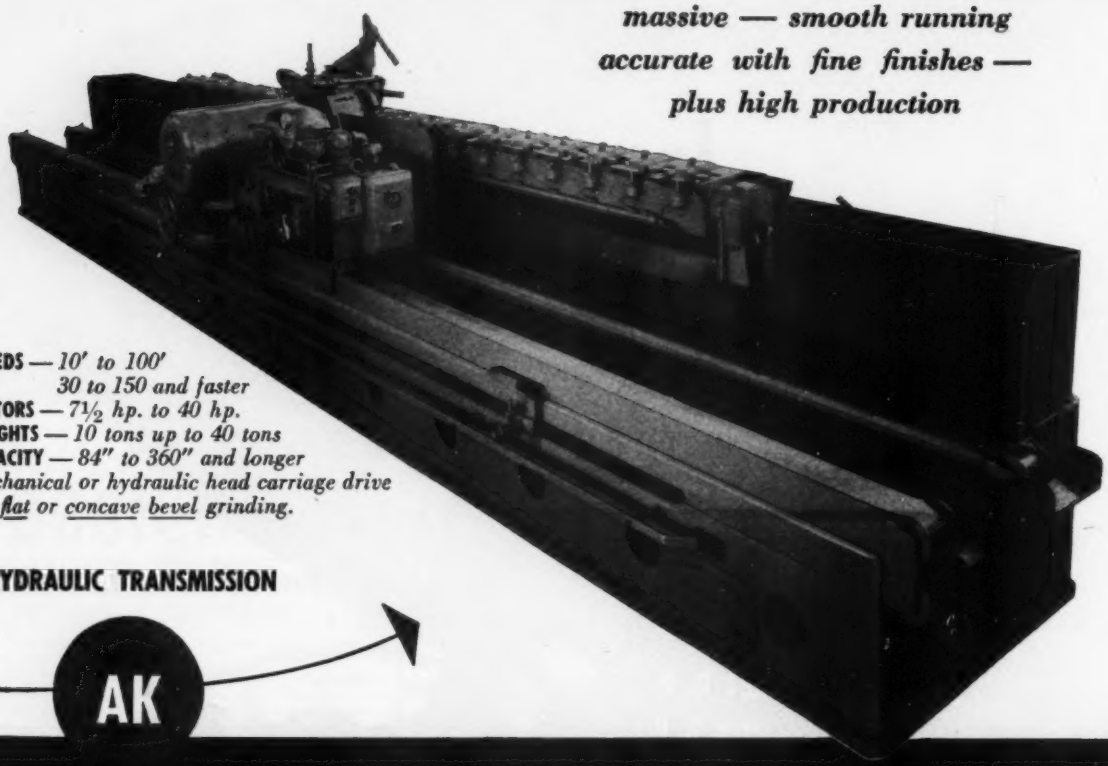
MR. C. H. VICKERY, Sales Manager of E. D. Jones & Sons Co., says:

"This example, typical of many in our files, helps explain the popularity of this versatile, highly economical refiner. More than 1000 of these 'mighty mites of stock preparation' have been sold (not including those made by imitators!) since it was introduced in 1935."

E. D. JONES & SONS COMPANY
Pittsfield, Massachusetts

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

massive — smooth running
accurate with fine finishes —
plus high production



SPEEDS — *10′ to 100′*
30 to 150 and faster
MOTORS — *7½ hp. to 40 hp.*
WEIGHTS — *10 tons up to 40 tons*
CAPACITY — *84″ to 360″ and longer*
Mechanical or hydraulic head carriage drive for flat or concave bevel grinding.

HYDRAULIC TRANSMISSION

AK

for the pulp and paper industries

HANCHETT *knife grinders*

FOR GRINDING CHIPPER — HOG — BARKER PAPER TRIMMER — DOCTOR BLADES

GK

FULLY AUTOMATIC TABLE DRIVES
HYDRAULIC OR ELECTRICAL

SPEEDS — *10′ to 80′ per minute (faster if required)*
CAPACITY — *32″ to 184″*
abrasives — segmental or cylinder type grinding wheels

FINEST KNIFE EDGES

HANCHETT MANUFACTURING COMPANY
World's largest manufacturer of knife grinding and saw sharpening machinery
MAIN OFFICE — Big Rapids, Michigan **WEST COAST** — Portland, Oregon

HANCHETT GRINDERS

The Paper Industry

April 1953

The Changing Pattern of Trade

The March 16th issue of *Foreign Commerce Weekly* draws attention to significant changes in the U.S. foreign trade pattern. Among the major characteristics of the new pattern are the sharp decline of nonmilitary exports to western Europe. These dropped from $4,200,000,000 in 1951 to $3,400,000,000 in 1952; while exports to Latin America declined from $3,900,000,000 to $3,700,000,000, and those to the Far East dropped from $2,100,000,000 to $2,000,000,000.

The major change in the import picture is the 16 per cent reduction of trade with the Far East, from $2,300,000,000 to $1,900,000,000. Total U.S. exports in 1952, excluding military aid, amounted to $13,200,000,000 and total imports were $10,700,000,000, leaving an excess of exports of $2,500,000,000 compared with an excess of exports in 1951 of $3,000,000,000.

In contrast to the declining volume of exports to most trading areas, shipments to Canada rose in 1952 from $2,700,000,000 to $3,000,000,000. While the bulk of our exports to Canada comprised machinery and equipment needed for Canada's rapidly expanding industrial capacity, these also included substantial shipments of many commodity groups such as chemicals, automobiles, and even textiles which showed no noticeable rise in volume to any other trading area.

Our imports from Canada showed marked increases in nonferrous ores, metals—mostly copper, lead, zinc, and nickel—newsprint, grain and feedstuffs. Pulp imports, on the other hand, were drastically reduced.

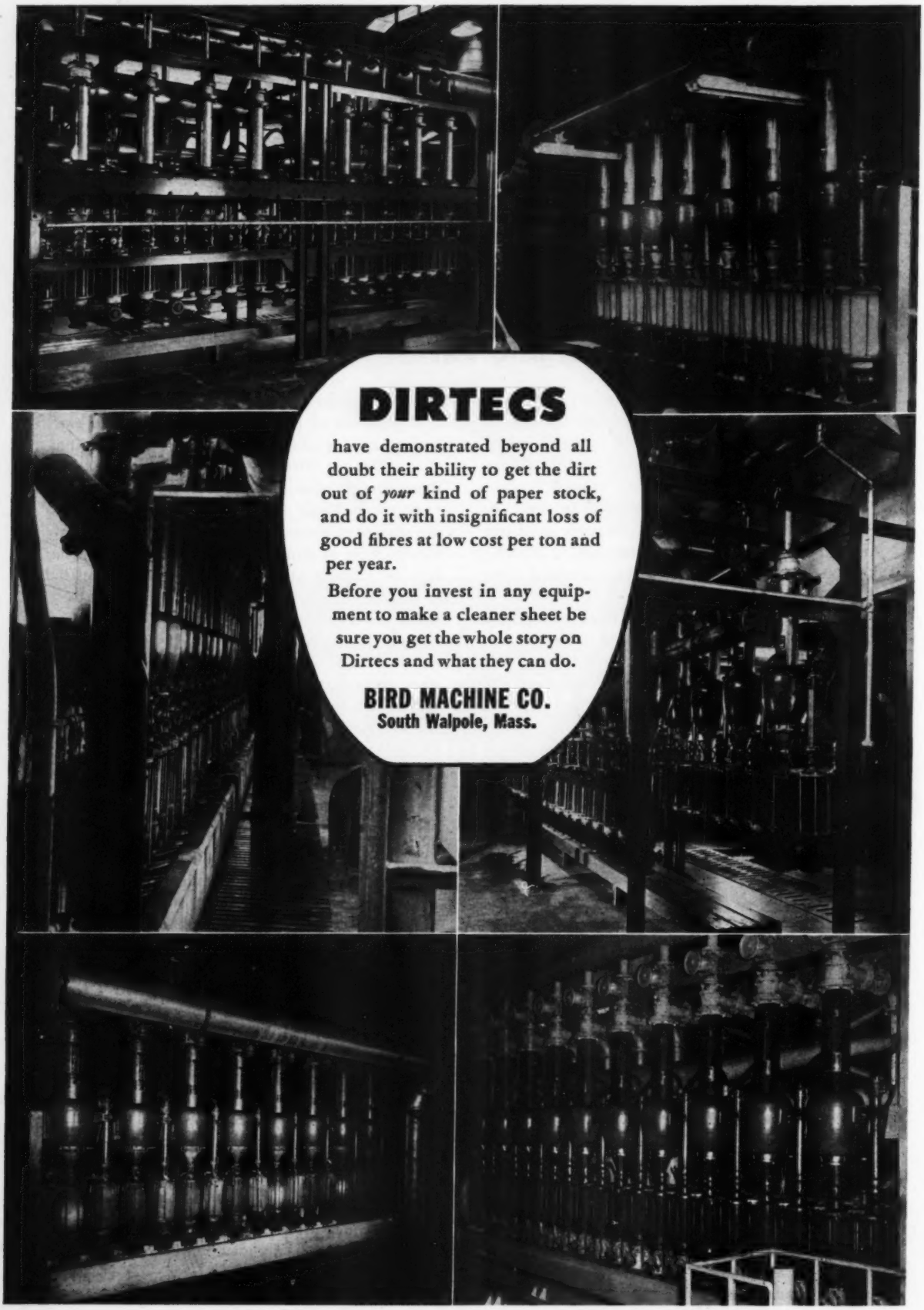
The strong trading activity between the United States and Canada shows a trend—a trend toward an ever increasing recognition of the importance of raw materials and natural resources. It is Canada's abundance of raw materials and natural resources that has contributed greatly toward the country's industrial growth and its spectacular accession to a dominant position in international trade. Canada now ranks first as a producer of newsprint, nickel, asbestos, and platinum; second as a producer of pulp, aluminum, gold, and zinc; it also ranks second in hydroelectric power output.

We are currently witnessing an extremely interesting reorientation of our concept of those basic values which are considered decisive in making nations economically strong. Whereas formerly nations were in position to achieve economic greatness as a result of mere possession of industrial and technical know-how, present requirements focus attention on the importance of natural resources. Industrial and technical know-how can be acquired as we are experiencing again and again—often to our great consternation, as in the case of nuclear fission. The possession of an abundance of natural resources, on the other hand, is rapidly becoming the main advantage and the great bargaining power that a nation either has or does not have.

Let us keep this in mind when we become concerned about the closing gap of our export-import balances and when we formulate plans for increased exploitation of our mines, oil fields, and forest reserves.

If we view our declining exports with as little emotional extravagance as possible, we must necessarily give full recognition to the important part imports play in the development of a sound trading structure that can cope not only with problems connected with bilateral trade balances but will also solve the complicated problems associated with multilateral trade and even global trade balances, and, at the same time, help us to conserve our natural resources. Certainly, a closer balance between our exports and imports must entail a greater effort on our part to promote the quality of our goods in the highly competitive market of international trade. But it is exactly in such an endeavor where the private enterprise system should have the widest margin of advantages over all other systems.

A. W. J. DYCK



DIRTECS

have demonstrated beyond all doubt their ability to get the dirt out of *your* kind of paper stock, and do it with insignificant loss of good fibres at low cost per ton and per year.

Before you invest in any equipment to make a cleaner sheet be sure you get the whole story on Dirtecs and what they can do.

BIRD MACHINE CO.
South Walpole, Mass.

Future bright . . . American capital abroad . . . new jobs for 70,000

Continued good business through all of 1953 is the current forecast in the paper industry and among economists in other industries, as against an earlier hesitation and some fear that there might be a slackening of business in the latter part of the year. This attitude was shown at the New York convention of the National Paper Trade Association the week of March 16, when Sydney Ferguson, president of the American Paper & Pulp Association, addressed the paper merchants organization at an open meeting. He said that selling will be more competitive, but that with aggressive salesmanship 1953 ought to show a good volume of business.

Thomas B. McCabe, president of Scott Paper Co., was equally optimistic. Instead of being banished to the kitchen as was the case in the previous Administration, Mr. McCabe said that the present opportunity is for industry to sit at the dining room table with labor, agriculture and the other elements of our economy. He urged the paper industry to rise to the stature of economic statesmanship which will permit this oportunity to be enjoyed.

This spirit of optimism is retained despite indications that Congress will be slow to cut taxes and possibly will even refuse to eliminate the excess profits tax at the end of June, as provided by present law.

World mill expansion

The exportation of American capital to foster industrial production abroad is showing a trend toward world paper mill expansion, not only in the direction of Canada which has been the chief gainer in recent years by investment of American funds in the Dominion. In addition, other countries are developing paper mill output from their own resources, as is the case with the Dominican Republic and Cuba, which are planning mills to utilize sugar cane waste.

Here are some of the developments, fostered in no small measure by the Point Four program for foreign aid:

Austria has received $36,000,000 in funds from this country through governmental agencies for the expansion of its paper industry. In addition, technical assistance and machinery has been provided to raise the practical financial aid to approximately $70,000,000. With the funds thus secured the Austrian mills are seeking and obtaining American markets for papers at prices below those prevailing in the American home market, and in some cases below United States costs of production.

Two grants have been provided Finland of approximately $20,000,000 each, and again American funds are being used to facilitate the invasion of the American market and competition with the domestic mills which have furnished, through taxes, part of the funds to assist their foreign competitors.

One American company, primarily interested in South American shipping, is operating paper and board mills in Guatemala for the production of paper and paperboard from bagasse and such grasses as citronella and lemon grass. Here again the United States is the market target.

Non-governmental Point 4

A more recent development is the inauguration of a program by an American paper merchandising firm for the building of paper mills in Latin America. This program includes the merchandising firm, a leading paper manufacturing company, and domestic manufacturers of paper mill machinery. English interests are participating in this development, which will include a paper mill in Brazil to make paper from eucalyptus and another in Costa Rica to utilize abaca fiber as a raw material. The triple alliance also envisages future similar Point Four programs of a non-governmental type in Africa and Asia.

American industry has answered the challenge of free trade and low duty proponents, which propose radical reductions in American tariff rates, by the formation of a new organization, to be known as the Committee of Industry, Agriculture and Labor on Import-Export Policy. About 125 representatives of these groups attended a conference at Washington to plan vigorous action to protect the domestic economy. As a result, a 15-man committee was named to steer the new organization, headed by O. R. Strackbein as chairman. Mr. Strackbein is best known from his activities for the protection of American labor against competition from foreign low-wage countries. While not represented on the steering committee, the paper industry was represented through the American Paper & Pulp Association and by a separate representative from a paper manufacturing company. Direct employment in the industries and producers represented was estimated at over four and a half million workers, or over 20 per cent of the nation's total work force in manufacturing, agriculture, mining and fisheries.

The conference unanimously adopted a declaration that undertook to answer the principal assumptions of those advocating further sharp duty rate reductions. It was stated that efforts to eliminate the dollar gap between exports and imports by further reckless tariff reductions could precipitate a recession that would quickly shake down our economy by tens of billions of dollars. We might thus get rid of the dollar gap but in return produce a gulf between our national output and our purchasing power. The final clause was:

"Better a gap than a gulf. Foreign trade would not pull us out of that hole."

Taxes and the budget

Meanwhile, the Ways and Means Committee of the House of Representatives has not been able to get its bill to cut income taxes on July 1 before the Congress, in view of the Administra-

tion's policy that the balancing of the budget should precede any tax reduction. The latent resentment of the Ways and Means Committee may serve to delay committee action on any bill to extend the Reciprocal Trade Agreement Act which expires in June, although a bill not yet introduced is expected to reach the committee in time for hearings in April. The attitude of that committee appears to be definitely in opposition to any radical action to reduce duty rates, though Administration pressure seems certain to result in some form of extension of the present law.

Washington reports indicate that the Administration is not favorably disposed toward what is known as the Bell Report. This report, produced by a committee of 12 representing the public, agriculture, industry and labor, plus the chairman, Daniel W. Bell, a Washington banker, was the answer to a request by former President Truman for an exhaustive study of tariff reform. The report was not completed in time to reach Mr. Truman before he left office and was delivered to President Eisenhower. It is safe to say that this report will "get nowhere fast."

Because of the commotion it has aroused, and because many of its statements will serve as ammunition for the low tariff advocates, it is well to summarize its proposals. In brief, it is proposed that tariff-making be taken from Congress and placed in the hands of the President, with the advice of a special commission. It is suggested that all commodities with a present duty rate of 10 per cent or less be placed on the free list. This would affect 23 principal grades of paper and paperboard. All rates between 10 and 20 per cent would, under this proposal, be cut to 10 per cent. The report consists of about 100 typewritten pages and suggests that all workers who may be displaced by import volume be retained for new jobs in other industries. It estimates that not over 70,000 workers would be forced to learn new trades. The report also suggests extensive simplification of customs.

Financial Reports

With the early 1953 lag in the securities markets ended and last year's high figures being closely approached, paper mill securities generally followed the market trends during March.

Net incomes

Abitibi Power & Paper Co. Ltd.—Net profit for the year ended December 31 was $9,097,759, compared to $12,997,877 in 1951.

American Box Board Co.—Net profit for the year to November 30 was $1,466,664, compared to $1,596,728 for the previous year.

Bowater Newfoundland Pulp & Paper Mills Ltd.—Net income for the

BLACK LIQUOR EVAPORATION PROBLEMS?

Let Swenson Engineering Help You Solve Them!

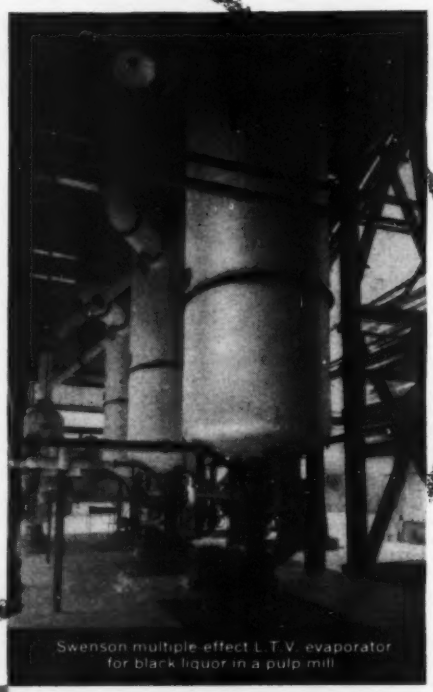
Take the *proved* way to more efficient black liquor evaporation . . . call on Swenson engineering! Swenson L.T.V. Evaporators were the *first* of this type to be adapted to the job. They provide lower cost operation . . . plus *all* the benefits of Swenson's specialized experience in this field.

Write for complete information today.

SWENSON EVAPORATOR COMPANY

15653 Lathrop Avenue, Harvey, Illinois

Evaporators • Pulp Washers • Filters • Causticizers • Digester Blow Condensers • Surface Condensers • Turpentine Condensers



Swenson multiple effect L.T.V. evaporator for black liquor in a pulp mill

SWENSON

Proved Engineering for the Process Industries SINCE 1889

A Division of WHITING Corporation

Get this helpful book!

"Heat Transfer and Crystallization" offers 52 pages of authoritative data on modern evaporation and crystallization methods. Ask for your copy today!

NEW ENGLAND—one in a series of scenes where Appleton Wires serve the paper industry.

PRACTICALLY everywhere you find a paper mill, you will find Appleton Wires. Though you ordinarily think of New England as the birthplace of new world traditions, rugged coastlines and industries of the sea—such as lobstering—it also has 277 paper mills, most of which know that *Appleton Wires are Good Wires!*

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

Another wooden Machine Room Roof continues to give satisfaction

• Schmidt & Ault Paper Company of York, Pennsylvania, knew what a serious maintenance problem they had in the roof over their machine room. Extremely high humidity and temperature in the rooms below made the roof a natural prey to rot and decay.

Starting in 1930, they began replacing the old gypsum roof, section by section, with pressure-treated "Wolmanized"* lumber. After years of satisfactory service, this roof is, according to Mr. Henry D. Schmidt, President of Schmidt & Ault, ". . . DOING A VERY GOOD JOB. SO MUCH SO THAT WE PLAN TO CONTINUE TO USE 'WOLMANIZED' LUMBER ON ANY OTHER ROOFS OVER ROOMS IN WHICH THE ATMOSPHERE IS INVARIABLY HUMID."

The construction of roof decks, floors and structural members in paper mills calls for the insulating qualities of wood. "Wolmanized" pressure-treatment makes this wood last longer.

Many of your maintenance problems are brought about by the continual presence of heat and humidity. "Wolmanized" lumber can solve these problems. Ask your plant engineer or architect about "Wolmanized" pressure-treated lumber . . . or write for complete information and the folder, "Wood Preservation."

American Lumber & Treating Company

General Offices: 1601 McCormick Bldg. • Chicago 4, Illinois

Offices: Little Rock, Ark. • Portland, Ore • Boston • Los Angeles
San Francisco • Baltimore • New York • Jacksonville, Fla.

Wolmanized
PRESSURE TREATED
Lumber
*Reg. U. S. Pat. Off.

year to September 30 was $4,617,474, compared with 1951's $4,069,829.

Camp Mfg. Co.—Net income in 1952 was $3,046,328, as compared with $3,025,450 in the previous year.

Canadian Celanese Ltd.—Net 1952 profit was $3,795,922, compared with $4,832,485 in 1951.

Canadian Chemical & Cellulose Co. Ltd.—Net 1952 loss of $2,233,255 was reported.

Celotex Corp.—Net profit for the quarter ended January 31 was $502,552, compared with $317,097 for the same period in 1951.

Champion Paper & Fibre Co.—Net income for nine months ended December 31 was $6,715,408, as compared with $7,408,286 in the comparable 1951 period.

Chesapeake Corp. of Virginia—Net income for 1952 was $2,669,209 as compared with $5,000,503 in 1951.

Consolidated Paper Co.—Net income for 1952 was $2,224,836, compared to $2,477,525 in 1951.

Eastern Corp.—Net income for 1952 was $1,008,699, compared to $1,582,446 in 1951.

Gair Co. Inc. (Robert)—1952 net income was $5,800,122, contrasted to $6,716,793 for the previous year.

Great Northern Paper Co.—Net profit for 1952 was $4,636,949, as compared with $4,739,427 for 1951.

Hammermill Paper Co.—Net income for 1952 was $1,208,200, compared with $1,808,900 in 1951.

Hinde & Dauch Paper Co.—Net 1952 profit was $3,132,453, as compared to $3,478,632 for 1951.

Hollingsworth & Whitney Co.—Net income in 1952 was $2,619,238, compared with $3,762,862 in 1951.

International Paper Co.—Net profit for 1952 was $52,125,952, compared with $56,819,172 in the previous year.

Marathon Corp.—Net earnings for the three months ended January 31 were $1,030,813, as against $1,905,081 in the same period in 1951.

Minnesota & Ontario Paper Co.—Net earnings for 1952 were $5,218,263, dropping some $215,000 behind the 1951 figure.

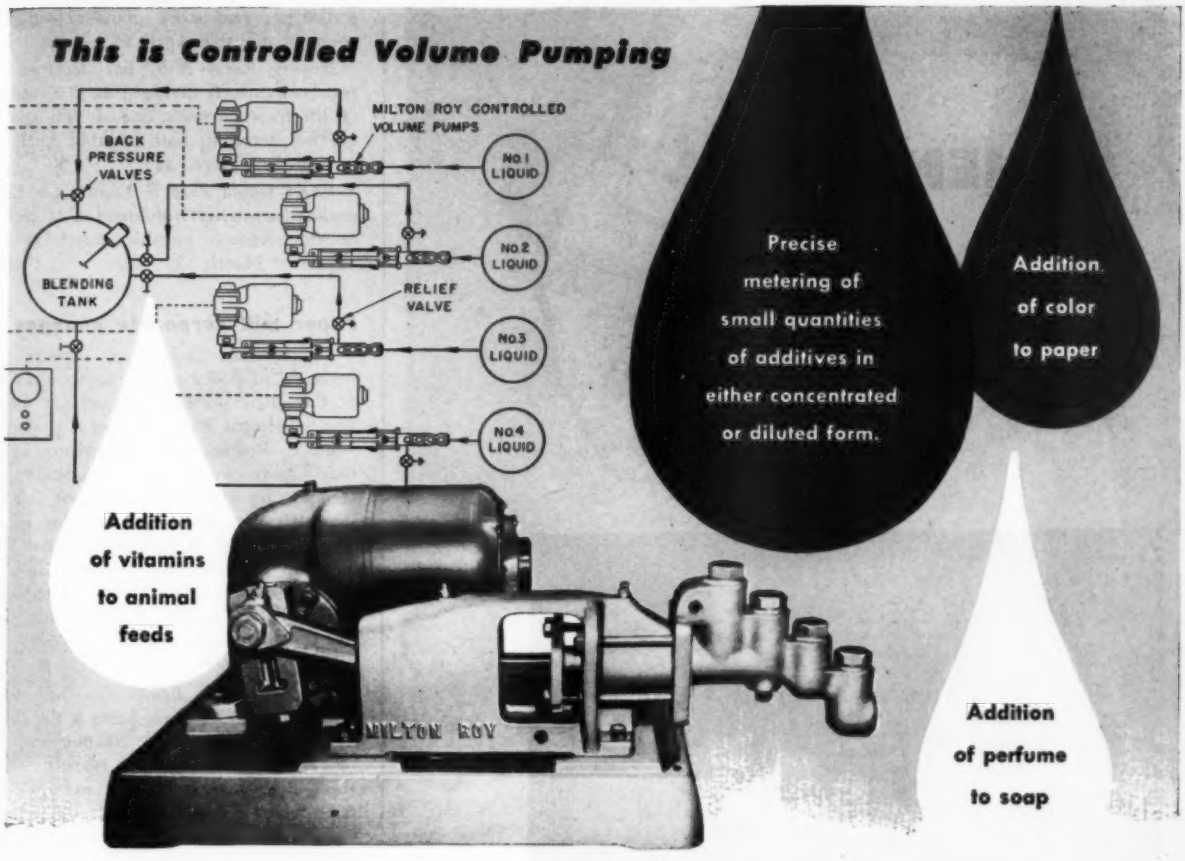
Puget Sound Pulp & Timber Co.—Net income in 1952 was $2,831,000, a decline of $747,270 from 1951.

Rayonier Inc.—Net income in 1952 was $10,986,457, as compared with $11,024,383 in 1951.

Dividend declarations

American Box Co. has declared a dividend of two shares of common stock for each 100 shares held of record March 27; also, a cash quarterly dividend of 37½ cents a share to record of April 17, payable April 30.

Crown Zellerbach Corp. has declared


This is Controlled Volume Pumping
MILTON ROY CONTROLLED VOLUME PUMPS
BACK PRESSURE VALVES
BLENDING TANK
RELIEF VALVE
NO.1 LIQUID
NO.2 LIQUID
NO.3 LIQUID
NO.4 LIQUID
Precise metering of small quantities of additives in either concentrated or diluted form.
Addition of color to paper
Addition of vitamins to animal feeds
Addition of perfume to soap
MILTON ROY

MILTON ROY CONTROLLED VOLUME PUMPS DO THE JOB

Wherever processes require the addition of liquids in either concentrated or diluted form, Milton Roy Controlled Volume Pumps have ideal application. Among the diversified industries where they are used for this purpose are food and food processing, pulp and paper, soap, pharmaceuticals, cosmetics, petroleum and petrochemicals, textiles and fibres, and brewing.

Continuous controlled volume feeding results in uniform blending of additive with basic product, assures rigid consistency of mixture or color among successive batches. Costly variations in content are avoided by holding delivery accuracy of the additives within a fraction of one per cent for most applications.

Wherever precision liquid component addition or blending is encountered in industry, Milton Roy equipment spells out marked returns in accuracy, efficiency and economy. As air-powered or motor-driven units, as components of automatic systems complete with a variety of automatic controls and accessory equipment, Milton Roy Controlled Volume Pumps give an assured accuracy and uniformity of product often impossible to obtain by any other method. Necessary changes in formulae can be accomplished quickly and accurately by manual or automatic adjustment of controls.

Capacities range from 3 milliliters per hour to about 50 gallons per minute, against pressures up to 25,000 pounds per square inch. Practically any liquid—slurries, suspension of solids, viscous or corrosive chemicals, tars, sludges—can be handled with equally precise efficiency.

For detailed information, call the Milton Roy representative listed in your classified telephone directory. Or write us direct.

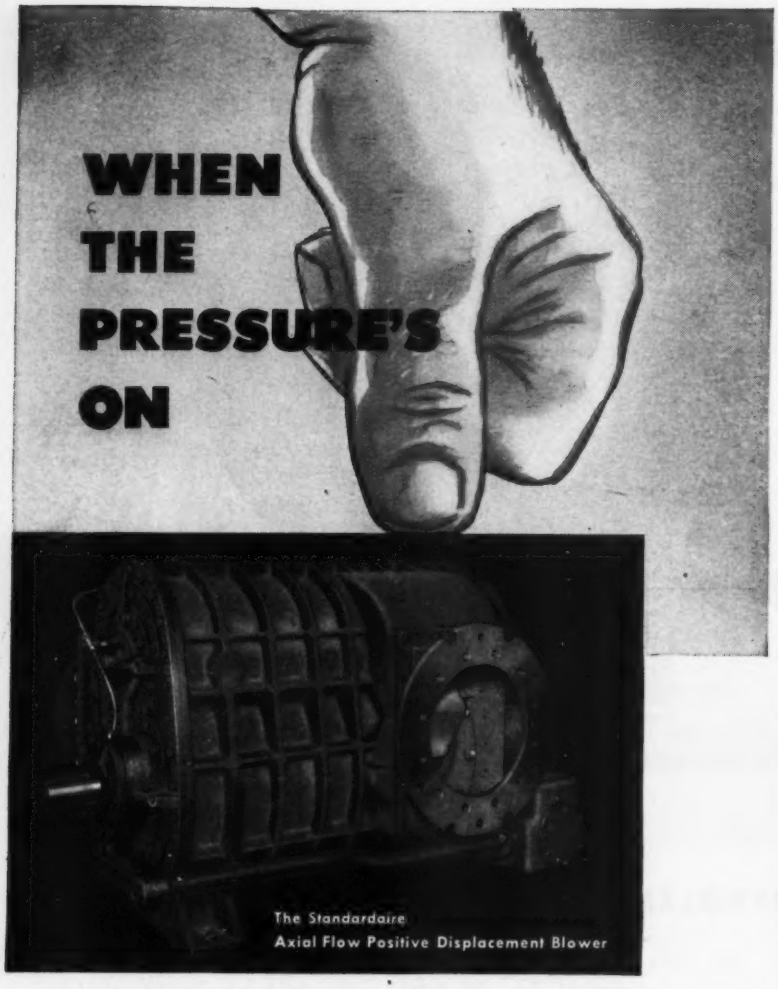
Manufacturing Engineers

WITH THE EXCLUSIVE STEP-VALVE DESIGN

MILTON Roy COMPANY

1316 EAST MERMAID LANE, PHILADELPHIA 18, PA.

CONTROLLED VOLUME PUMPS AND AUTOMATIC CHEMICAL FEED SYSTEMS



for increased air handling efficiency . . .

Consider a Standardaire Axial Flow Positive Displacement Blower *first*. Its unusual design features provide the greatest output per pound of weight ever achieved in this type of blower.

The Standardaire Blower employs an exclusive means of compression which provides a wide range of pressures with a minimum of internal losses. It can be operated at high speeds, permitting direct drive by favorably priced, standard motors in an efficient speed range.

Air is drawn in and discharged smoothly. Compression is gradual and free from the shocks which load internal parts and decrease efficiency.

These are but a few of the unique features of this compact unit which assure outstanding results. For further information, write . . .

570 LEXINGTON AVENUE NEW YORK 17 NEW YORK

READ STANDARD CORPORATION

a 100 per cent stock dividend on the common, payable April 1.

Hoberg Paper Mills has declared a regular quarterly dividend of 37½ cents on the common stock, one of 34⅜ cents on the preferred; both payable April 1 to record of March 11.

Puget Sound Pulp & Timber Co. has declared a quarterly dividend of 50 cents on the common, payable March 31 to record of March 12.

Paper mill corporate changes

Crown Zellerbach Corp. expects to make its proposed offers for acquisition of Canadian Western Lumber Co. Ltd. and St. Helens Pulp & Paper Co. about May 1. Previous announcements said that Crown would offer one share of common for each three shares of Canadian Western, and one share for each 1⅔ shares of St. Helens. If the Canadian Western proposal goes through, Crown will then have 100 per cent ownership of Elk Falls Co. Ltd., which is now 50 per cent owned by Pacific Mills Ltd., a C-Z subsidiary.

Federal Paper Board Co. has announced that Goldman, Sachs & Co. and associates have placed 200,000 shares of Federal common on the market. This transaction marks the first public distribution of the firm's shares. The offering represents outstanding stock being sold by certain holders. The shares are priced at $17.

New York Stock Exchange—Stocks

	Closing Prices March 20, 1953	Feb. 19, 1953
A.P.W. Products	3	4⅝
Celotex	19½	17⅞
Same Preferred	16⅞	*16–16¾
Certain-Teed Products	15½	14⅛
Champion P&F Co.	31½	30⅛
Same Preferred	*101½–103½	*101½–102
Chesapeake Corp.	31	30¾
Continental Diamond	12⅝	12⅝
Container Corp.	43½	43¾
Same Preferred	*101⅝–103	101¾
Crown Zellerbach	66⅜	65½
Same Preferred	102	*101½–101¾
Dixie Cup	37	* 37–37⅜
Eastern Corp.	17¼	* 16–16¼
Robert Gair	19⅞	19½
Gaylord Container	29	25⅝
Hammermill	15⅞	15½
International Paper	56	53¼
Same Preferred	101	100½
Kimberly-Clark	44½	43⅝
Mac Andrews & Forbes	44½	44⅝
Marathon	21⅝	23¼
Masonite	24¼	23⅞
Mead Corp.	28	* 25¼–25½
Same Preferred	93½	* 91½–93
National Container	10⅜	10½
Rayonier, Inc.	30	29
Same Preferred	33⅞	33⅞
Scott Paper	57½	58
Same $3.40 Preferred	88	* 87–88
Same $4 Preferred	105	*104–105
St. Regis Paper	22½	19½
Same Preferred	* 92⅛–94	93
Sutherland Paper	26¾	25½
Same Preferred	109¾	*106–107
Union Bag & Paper	49¼	47⅞
United Board & Carton	16½	14
United Wall Paper	3⅝	3½
Same Preferred	29¼	* 25–26
U.S. Gypsum	115	114½
Same Preferred	176	*171½–174
West Virginia P. & P.	78⅝	* 79–81
Same Preferred	107½	*107¼–107⅜

New York Stock Exchange—Bonds

Celotex 3½%	.....	.....
Champion P&F Co. 3%	.....	.....
Mead Corp. 3%	.....	.....

American Stock Exchange—Stocks

Am. Writing	10¼	9⅞
Brown Co.	11¾	10⅛
Brown Co. $5 Preferred	97	96½
Same Preferred $3	49½	48
Great Northern Paper	57½	56
Puget Sound	30½	29

*Closing Bid and Asked Prices

AS AN INVESTMENT . . .

From forest to final product, paper is "big business"—dynamic, prolific, productive—a basic industry rooted in America's basic needs. Study the earning power of this near-fabulous giant—past and potential. See how wisely your investment dollars are at work in the world of paper. *Everyone* uses paper . . . relies on it, benefits from it! Anyway you look at it—paper is here *for good!*

BELOIT IRON WORKS · PAPER MACHINERY · BELOIT, WIS., U.S.A.

PREPARED IN THE PUBLIC INTEREST BY BELOIT IRON WORKS, BELOIT, WISCONSIN
MAKERS OF HIGH-SPEED, HIGH-PRODUCTION PAPER MACHINERY SINCE 1858

BELOIT

PAPER MACHINERY

WHEN YOU BUY BELOIT . . . YOU BUY MORE THAN A MACHINE!

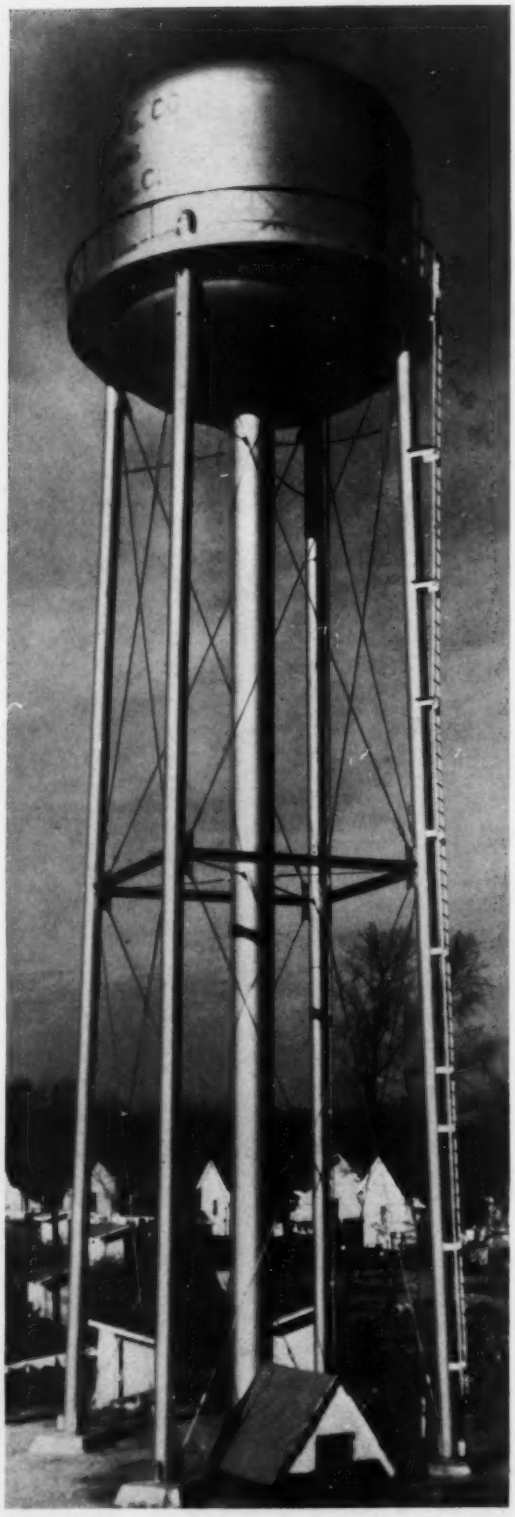
CUT INSURANCE COSTS WITH A

HORTON

ELEVATED TANK

THE 50,000-gal. Horton elevated tank shown at right provides a gravity pressure water supply for sprinkler service at the Eastern Manufacturing Company's plant at Selma, Alabama. Installation of the tank and an automatic sprinkler system assures the company of adequate fire protection with a substantial reduction in fire insurance rates.

Horton elevated tanks for sprinkler service or general plant needs are built in standard capacities from 15,000 to 500,000 gallons. For further information, please write our nearest office. There is no obligation on your part.



Right: This 50,000-gal. Horton ellipsoidal-bottom elevated tank provides water for fire protection at the Eastern Manufacturing Company's plant at Selma, Alabama

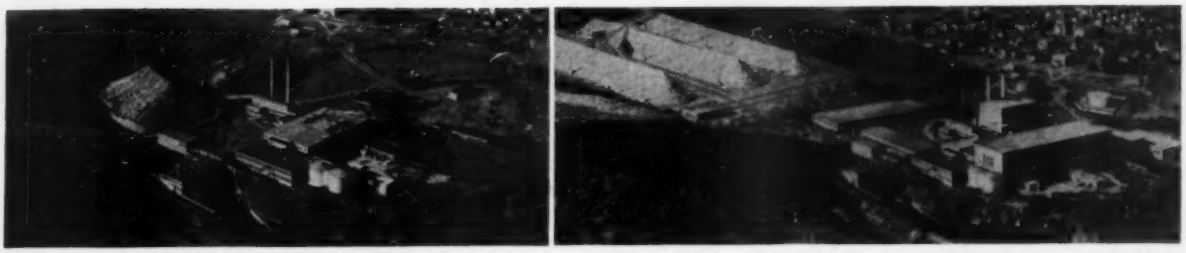
CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2143 Healey Building
Birmingham, 1.....1511 North 50th Street
Boston, 10.....1026—201 Devonshire Street
Chicago, 4.....2445 McCormick Building
Cleveland, 15.....2267 Midland Building
Detroit, 26.....1566 Lafayette Building
Havanna.....402 Abreu Building
Houston, 2.....2143 C & I Life Building
Los Angeles, 17...1559 General Petroleum Building
New York, 6.....3350—165 Broadway Building
Philadelphia, 3...1653—1700 Walnut Street Building
San Francisco, 4.....1547—200 Bush Street
Seattle, 1.....1327 Henry Building
Tulsa, 3.....1451 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

In Canada: HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

The Paper Industry News of the Industry



GREAT NORTHERN mill at E. Millinocket today (left) and artist's conception of future expansion

Great Northern to Increase Production at East Millinocket

Development and expansion plans for the Great Northern Paper Co. mill at East Millinocket, Maine, that would bring the capacity to approximately 900 tons daily were announced recently by M. C. McDonald, president of the firm:

1. Construction of a complete new woodroom building west of the present mill and conversion of the old woodroom into a water treatment plant.

2. Construction of a second grinder room equipped to handle either soft- or hardwood and a building furnished with the necessary equipment for pre-treating hardwood for grinding.

3. A new paper machine room will be built east of and adjacent to the present machine room. This building will be large enough for two 276-inch newsprint machines, mechanically suitable for operation at 2,500 fpm.

4. To provide additional process steam and by-product power for the increased production, a new boiler house with one 300,000-lb. high-pressure boiler, one 12,500 kw turbine and auxiliaries will be built adjoining the present boiler house.

5. A new finishing room and train shed will be provided. The machine shop will be enlarged and re-equipped, and various other equipment in the existing plant will be replaced to meet the needs of increased production.

6. The program will be completed with the installation of a second paper machine and the enlargement of the grinder room and steam plant.

Construction, scheduled to begin about May 1, will be by Stone & Webster Engineering Co. The cost has been estimated at approximately $20,000,000.

Forecast for 1953 Expansion: $400,000,000

More than $400,000,000 will be spent by the pulp and paper industry this year for new plant facilities that will substantially increase productive capacity. With world decontrol of sulfur, the industry is preparing to go ahead at full speed on its ambitious 10-year expansion and modernization program.

In the seven years since the end of World War II, it was reported recently by the APPA, the industry has spent more than $3 billion on plants and equipment for the production of all kinds of paper and paper products. By the end of 1955, if all announced projects are completed, potential annual capacity for woodpulp will have been increased to 22,366,000 tons, compared with 17,123,889 at the end of 1950.

The industry managed to withstand the world shortage of sulfur without serious trouble. The domestic sulfur industry annually supplies nearly 400,000 tons of crude to mills in this country and Canada and has expanded its facilities to increase output more than two and a half times above pre-war levels. An estimated 2,000,000 tons of new capacity will have been added to overall production in this country between 1952 and the end of 1955, according to a tabulation by Freeport Sulphur Co. This includes 1,370,000 tons of salt dome brimstone.

Eight new woodpulp plants were put into operation in 1952, and construction was started on three others. Most of this activity is centered in the South.

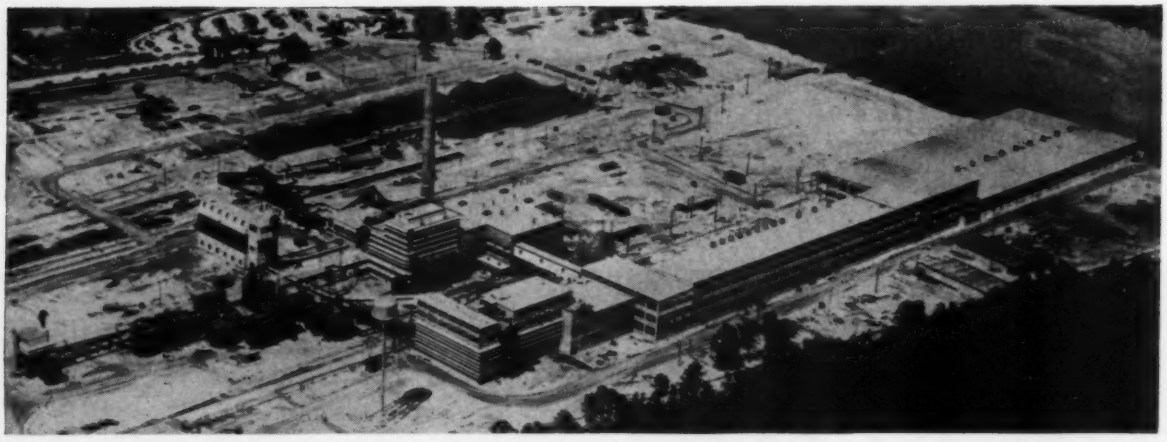
New mills

New mills now in production or under construction include: Buckeye Cotton Oil Co., Memphis; Ketchikan Pulp Co., Ketchikan, Alaska; Olin Industries Inc., Pisgah Forest, N. C.; St. Joe Paper Co., Port St. Joe., Fla.; Weyerhaeuser Timber Co., Longview and Everett, Wash.; International Paper Co., Natchez, Miss.; Ruberoid Co., Dallas, and St. Regis Paper Co., Jacksonville, Fla. Others in the planning stage include three in Georgia: Rome Kraft at Rome; Rayonier Inc. at Brunswick, and National Container at Clyattville.

According to APPA, the biggest increase in papermaking activities will

NEWS HIGHLIGHTS

Grt. Northern to Boost Output.....35
'53 Expansion: $400,000,000.....35
Scott Awards Everett Contract.....36
$56 Million Plant Proposed.....36
Consolidated Starts Evaporating Plant.....39
Pollution "Answer" Offered.....40
Precast Concrete Sandwich Panels Used in B.C.....47
Newsprint from Hardwood.....54
Government Loan for Newsprint Mill Urged.....54



MAJOR EXPANSION PROGRAM is underway at the Port Wentworth, Ga., mill of Southern Paperboard Corp.; increased capacity will be gained through the use of a high-yield process, making additions to the pulp mill necessary; included will be one new boiler, a turbine, three digesters, and a new refining capacity; J. E. Sirrine Co. of Greenville, S.C., is engineering the project; general contractor is Daniel Construction Co. of Birmingham, Ala., and Greenville

come in coarse papers such as wrapping paper, bags, greaseproof and vegetable parchments, building paper, paper boxes, and other containers. Newsprint will benefit by an 8 per cent increase over 1951 capacity. By the end of 1955, some 267,000 tons of new capacity will have been added to domestic mills, which last year turned out approximately 1,150,000 tons.

The expansion program will result in a 3 per cent increase in production for book and groundwood papers and tissue paper, and 2 per cent for writing, text, bristol, and other fine papers. Facilities for producing paperboard, wet machine and building board will go up to 13,667,350 tons in the same five-year period.

Scott Awards Contract for Everett Mill

It was announced March 16 that Scott Paper Co. of Chester, Pa., has awarded the contract for construction of its new paper mill at Everett, Wash., to Howard S. Wright Co. Inc. and American Pile Driving Co. Inc., both of Everett. The award was made on the basis of competitive bids and calls for the construction of buildings for both the paper mill and the finishing units. These same two firms have also contracted to erect the new high-speed paper machine and auxiliary equipment.

The paper mill will directly adjoin the existing Soundview Division pulp mill at Everett. Pile driving and other preliminary work at the site is being done by Manson Construction & Engineering Co., Associated Sand & Gravel Co. and others. Such work is far enough along so that construction work on the buildings can begin immediately. It is expected that paper mill operations will start early in 1954. At that time, Scott plans to manufacture part of its line of quality household paper products at its integrated Everett operation.

BELTING INSTALLATION CREW at work on the new Brown Paper Mills plant in Montevideo, Uruguay; in charge of this installation is Bill Knight (center, left hand on belt), Graton & Knight Co. belting technician; he was flown to Uruguay from the G&K plant in Worcester, Mass., to supervise the crew which made the leather belting installation on the paper machine

$56 Million Alaska Plant Proposed

Construction of a $56,511,000 pulp and newsprint mill near Juneau, Alaska, has been proposed by Georgia Pacific Co. of New York, N.Y. It has been reported that the firm has filed a certificate of necessity with the National Production Authority in Washington, D.C. The proposed newsprint unit would include a chemical pulp plant, paper mill, and power plant. Production is expected to be about 96,000 tons annually.

C-Z Astoria Mill Plans Uncertain After Merger

Crown Zellerbach Corp. is not prepared to say what effect the proposed merger with St. Helens Pulp & Paper Co. would have on possibilities of establishing a pulp mill in the Astoria, Ore., area. The firm had announced several months ago that it was considering such a mill if an agreement could be reached to pool the production of C-Z timber holdings with those of state- and county-owned properties in Clatsop County. The decision is awaiting completion of a state forestry department survey of the state-county holdings.

C-Z owns approximately 135,000 acres of timberland in Clatsop county. St. Helens owns about 50,000, most of them adjoining the C-Z properties. State-

Puseyjones at Work

When the Sheet is on the Wire . . .

Fourdrinier Wet End of a Puseyjones Machine for light-weight kraft bag and wrapping papers in the South.

Top: Fourdrinier Wet End of a new Specialty Machine built by Puseyjones for a large mill in the Middle West.

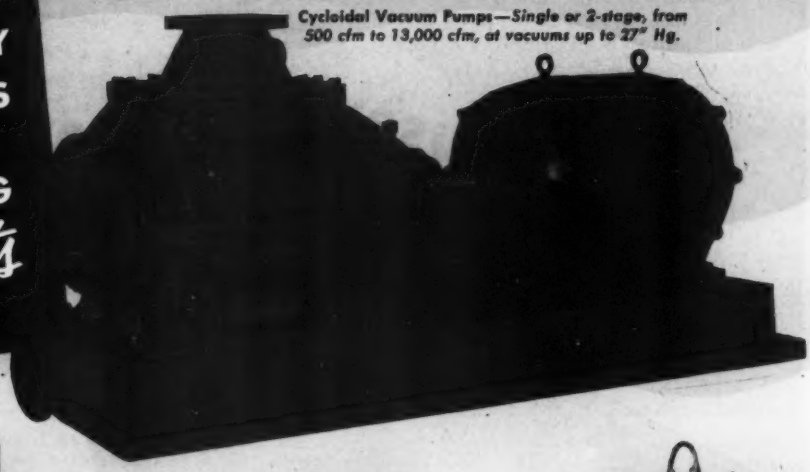
Bottom: Rapi-Drape Wire Handling for new or existing machines is one of the many design improvements and labor-saving devices developed by Puseyjones.

Take a look at the Fourdrinier Wet End of a new high-speed Puseyjones Machine. See how the skills of many craftsmen are combined to form a top-quality sheet at high running speeds. When you buy a Puseyjones Machine, you get a machine-building experience of more than 100 years. Whatever your paper-making problem may be, the experience and facilities of this organization are yours to command. Write us today.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

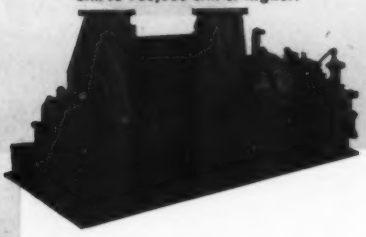
HIGH-EFFICIENCY VACUUM PUMPS BUILT BY AIR HANDLING *Specialists*

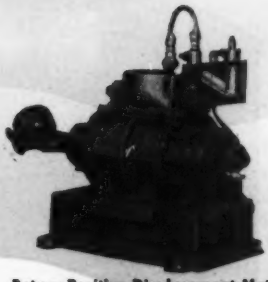


Cycloidal Vacuum Pumps—*Single or 2-stage, from 500 cfm to 13,000 cfm, at vacuums up to 27" Hg.*

Inert Gas Generators
Portable or stationary, from 1,000 cfh to 35,000 cfh.

Centrifugal Blowers and Exhausters
Single and multi-stage, from 2,000 cfm to 100,000 cfm or higher.





Rotary Positive Displacement Meters
4,000 cfh to 1,000,000 cfh.

Rotary Positive Gas Pumps
5 cfm to 50,000 cfm.

Rotary Positive Blowers and Exhausters
5 cfm to 50,000 cfm.

The wide acceptance of R-C Vacuum Pumps is the result of extremely low cost for power and water, and proved long-time reliability of these simple rotary positive units. Further, because they operate at higher speeds (600 rpm and above), they require smaller motors, less floor space and lower foundation cost. This naturally reduces initial investment and thus increases the percentage of operation savings.

The successful performance of R-C Vacuum Pumps comes from almost a century of experience in handling air and gas. That is our exclusive business — we are "specialists" in that job. We are also the only builders of the *dual-ability* line of Centrifugal and Rotary Positive Blowers, Exhauster and Gas Pumps. Because of this, we can offer you the unbiased, *dual choice* of units that are best fitted to your requirements. And, the wide range of capacities of R-C equipment eliminates oversizing, thus reducing first cost and lowering operating expense.

For your present or future needs, you will get sound advice and competent co-operation by calling on Roots-Connersville specialists in handling gas or air.

ROOTS-CONNERSVILLE

Exclusive Specialists in Handling Gas and Air

BLOWER BUILDERS SINCE 1854

ROOTS-CONNERSVILLE BLOWER A DIVISION OF DRESSER INDUSTRIES, INC.
534 Monroe Ave. • Connersville, Indiana

county forest holdings toal 139,000 acres. F. N. Youngman, C-Z vice president, declared that his firm is still interested in pulp mill possibilities here but cannot say what effect the merger, if consummated, will have.

Expansion Notes

S. D. Warren Co.
with mills at Westbrook and Gardiner, Maine, plans to acquire Central Paper Co. of Muskegon, Mich., through the offer of one common share for two shares of Central, a manufacturer of kraft specialties. Warren plans to retain some of this production but will gradually convert part to the printing and specialty papers it makes in Maine. Central has a capacity of about 40,000 tons and employs some 700 workers.

Northern Paper Mills,
Green Bay, has completed installation of a new Roberts grinder permitting 100 per cent production of all groundwood fiber used by the firm. Powered by a 2500 hp motor, the grinder has a daily capacity of 26 tons.

Hudson Pulp & Paper Co.
is introducing several new lines of kraft paper products as a result of its multi-million dollar expansion of integrated manufacturing facilities. The firm has announced the introduction of a new line of garment and pants bags and will soon feature a line of waterproof papers. Next on the list of new products will be pint and quart liquor bags.

National Container Corp.
has purchased Empire Box Co. Inc. in Atlanta. The firm will continue manufacturing operations of the fully-integrated box plant under the National Container corporate name. Sidney B. Marks is general manager.

West Virginia Pulp & Paper Co.
has scheduled the shut-down of two paper machines at the Covington, Va., plant. According to David L. Luke Jr., president, they will be replaced by a "new and modern machine."

Prairie State Paper Mills
of Chicago has completed a 60,000-sq. ft. addition to its Joliet plant to house the new waterproof paper division. Construction of a waterproof paper laminating machine has been completed.

Continental Can Co.,
New York, N.Y., has acquired the assets and business of Benjamin C. Betner Co., Devon, Pa. Betner, which will be operated as a separate division, manufactures small and medium sized bags from paper, foils, cellophane laminates, plastics and wax paper.

New Bleach Plant "Poured" for Hollingsworth & Whitney

A new bleach plant—reported to be the first where the building as well as the bleaching towers were built by the sliding form method of concrete construction—has been completed at the Hollingsworth & Whitney Co. paper mill at Mobile, Ala., according to Rust Engineering Co. of Pittsburgh, designer-constructor.

The new unit undertaken in H&W's modernization and expansion program will increase the mill's existing bleach stock capacity by 150 tons per day. The six-story building was poured by the sliding form method in 10 days, including columns and nine bleaching towers that went up with the walls.

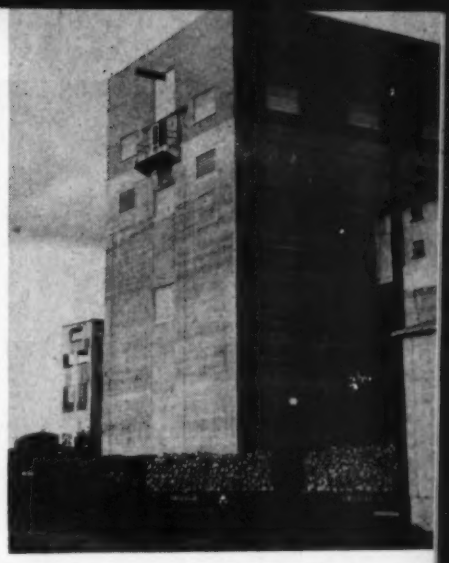
The building was literally hauled up by its own screwjacks in a continuous lift operation. Rust engineers estimate the sliding form method is nearly 10 times faster than similar construction with fixed or so-called movable forms. In this construction method, 1-in. rods of special alloy steel are set vertically among the reinforcing rods in the concrete at intervals. A screwjack mounted on a yoke climbs each special jack rod by means of dogs. As the screwjack is turned it pulls up the yoke, which in turn hauls up an attached wooden form and working platform.

Rate of climb

The rate of climb depends on the rate at which the concrete sets—slower on a cool wet day, faster on a hot dry day. The 20-foot jack rods are continuously extended by a pipe sleeve arrangement as the walls go up. Height of the rods is carefully staggered for strength and continuous operation.

The height of the bleach plant walls at the Mobile unit is 77¼ ft. The nine bleaching towers themselves average 14 ft. in diameter and 60 ft. in height. They reach to the operating floor on the top level of the building. The operating floor has an exterior brick wall with glass block windows and contains the bleach plant controls and laboratory. Consistency of the paper stock and temperature of the wash water are automatically controlled from this floor. Manual controls located here can regulate flow of stock and adjust flow of the various chemical solutions used in the process. Kamyr continuous bleaching is used.

Two 30-ft. diameter by 46½-ft. high concrete storage tanks for bleached stock were also constructed by the sliding form method and adjoin the four previously constructed storage tanks outside the bleach plant.



BELIEVED TO BE the first bleach plant ever constructed in one continuous pour, this unit at the Hollingsworth & Whitney Co. mill at Mobile, Ala., went up in 10 days

Consolidated Puts $500,000 Plant for Evaporating Liquor into Operation

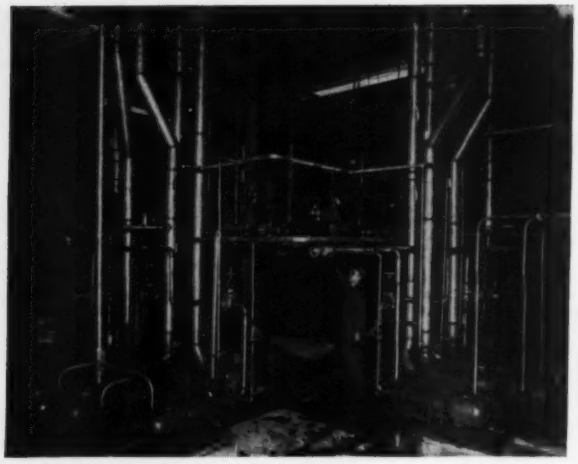
THE PULP AND PAPER industry's biggest installation of Rosenblad reversible flow quadruple-effect evaporators was placed in operation at Appleton, Wis., early in March. The installation is at the Interlake mill of Consolidated Water Power & Paper Co.

The operation has capacity to handle the mill's entire supply of collectible spent sulfite liquor. Collected at approximately 13.3 per cent solids content, 200,000 gal. per day will be evaporated to 60 per cent solids for use as boiler fuel. Burning is in a vertical cyclone type furnace converted to this purpose from designs by company engineers. Experience with this furnace in combustion and ash production will be checked before conversion of another furnace to increase steam output.

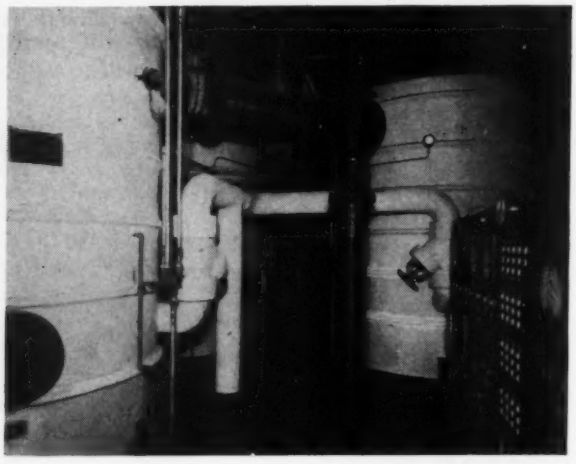
Partially experimental

Consolidated's management considers the Interlake installation as partially experimental and looks to experience at Appleton for guidance in making its plans to process the sulfite liquor from the firm's considerably larger sulfite mill at Wisconsin Rapids.

"We are, of course, sure that the new plant will produce fuel and thus make steam," Stanton W. Mead, president of Consolidated, declared. "We cannot be certain of operating efficiency and actual costs until the plant runs for quite a while. Also, there are dozens



FINAL INSPECTION of piping and valves in the new anti-pollution plant; shown above are circulation and transfer pumps, level control valves, and one of the submerged heaters (upper right)



FOUR OF THE FIVE vapor bodies utilized in Consolidated's new operation to burn spent sulfite liquor; also shown are the control panel, two falling film heaters (background) and stainless piping

of technical problems that can be answered only through actual experience.

"We expect that this Interlake installation will provide our company with answers that we need for deciding wisely about our other operations. It is of equally great importance to the interests of conservation that processes which are adopted by the industry to clean up Wisconsin streams shall prove not only effective but also economically supportable."

More than $500,000 has already been invested in the evaporation and burning plant, and subsequent modifications will substantially increase that figure. Long-range plans include the probable installation of high-pressure steam boilers and generating equipment to permit production of power.

Because Interlake is farthest upstream of the four sulfite mills along the Fox River, the new installation will free the upper reaches of the stream from all sulfite content except the dilute and unimportant fraction carried in with the wash water.

Spent sulfite liquor is collected from the mill's nine Mitscherlich digesters and pumped to a sulfur dioxide reclamation system and then to a 79,000-gal. storage tank. From here it is pumped through 60-mesh screens to the evaporator plant.

Equipment and operation

Five huge vapor bodies and four heaters, all of type 316 stainless steel and manufactured by General American Transportation Corp., form the heart of the new unit. They were built to a design devised by Swedish engineers during World War II and only recently obtainable in this country. Until the Swedish development, evaporation of calcium base spent sulfite liquor for burning was economically impossible because lime deposits plugged the available evaporator types.

Two of the heaters are of the falling film type, while two are of the submerged surface type. There is counter flow between liquors and vapors. The heaters have 2,000 sq. ft. liquor heating surfaces and are interconnected with the five vapor bodies; the fifth body is necessary for alternating liquor and heating surfaces at intervals determined by operations. There are the necessary transfer and condensate pumps (supplied by Worthington Corp., Goulds Pumps Inc. and De Laval Steam Turbine Co.) and intermediate piping (General American). The piping is constructed so that all pipes carrying liquor in one operation carry condensate in the next, thereby flushing these lines to remove scale previously formed. The plant is designed to operate between 35 lb. psig and 2 in. HG absolute.

All equipment including valves (Hasco Valve & Machine Co.) and piping is type 316 stainless steel. Heaters are type 316 extra low carbon stainless steel. Equipment is operated from a control panel board with the exception of a few periodic operations that require manual control, such as switching liquor flow from one side to the other. Instruments were supplied by Taylor Instrument Companies and Bailey Meter Co., while the temperature recorder was manufactured by Leeds & Northrup Co.

The evaporators are designed to evaporate normally 52,900 lb. of water per hour, attaining 3.56 lb. of water evaporated per pound of steam. The collected liquor is at about 13.3 per cent concentration on entering the evaporator. It is therefore necessary to remove by evaporation more than 3.5 lb. of water to produce 1 lb. of 60 per cent concentrate. The steam consumption is thus at about 1 lb. of steam to produce 1 lb. of the 60 per cent concentrate.

An American Heat Reclaiming Corp. spiral heat exchanger is incorporated in the system to utilize heat from the condensate to increase the temperature of the liquor between effects.

Additional suppliers

Additional equipment used in the new installation is as follows: *Structural steel,* Wisconsin Bridge & Iron Co.; *tanks,* Felker Brothers Mfg. Co.; *electrical equipment,* General Electric Co. and Cutler-Hammer Inc.; *condenser,* Ingersoll-Rand Co. and Heresite & Chemical Co.; *atomizing spray nozzles,* The Babcock & Wilcox Co.; *fans,* Westinghouse Electric Corp.; *dust collector,* Prat-Daniel Corp.; *vane feeders,* United Conveyor Corp.; *rotometer,* Bailey Meter Co. and Fischer & Porter Co., and *insulation,* Industrial Insulation Co.

Pollution "Answer" Offered at Los Angeles Meeting

The use of magnesium bisulfite instead of the present calcium bisulfite as the cooking agent in the woodpulp production process is the "complete answer" to the problem of stream pollution by paper mill wates. This was the view expressed recently by F. G. Ely of Babcock & Wilcox Co. as he addressed the national meeting of the American Chemical Society in Los Angeles.

"When magnesium bisulfite is the cooking agent," he said, "the digester residual liquor can be satisfactorily evaporated and burned, the chemicals recovered for reuse, and the heat from the combustion of the organics used for the efficient generation of steam and power." In addition, the process has a sound economic basis through savings in raw materials, fuel use, and in other directions.

Experience with a pilot plant at Long-

Fig. 375—200-pound Bronze Gate Valve with renewable, wear-resisting "Powellium" nickel-bronze disc.

The name "POWELL" on a valve assures absolute dependability

Naturally, in buying a valve, the first consideration is its ability to perform a specific service. But that is not all. For it must also be a valve that will continue to function dependably for a long time. Powell Valves have an established reputation for this dependability.

The Wm. Powell Company
Cincinnati 22, Ohio

POWELL

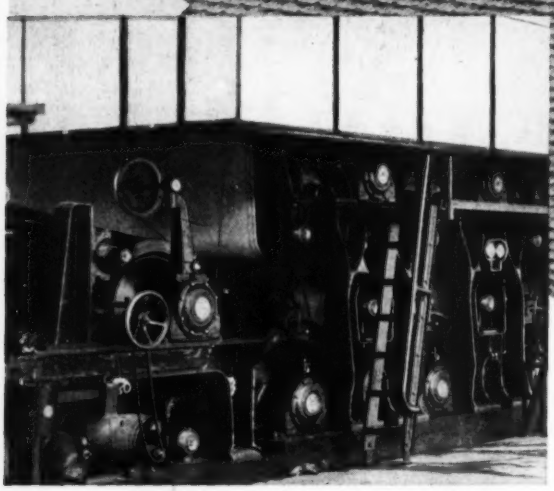
DEPENDABLE VALVES SINCE 1846

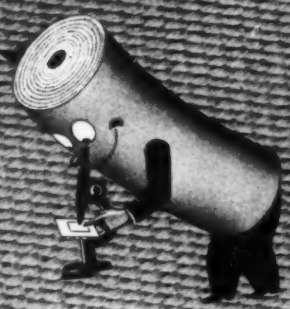
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES

SCIENTIFIC CONSTRUCTION*
Makes The Big Difference In DRYER FELTS

WOODBERRY 887
REINFORCED DRYER FELT

Gives You Scientific Construction





*Asbestos yarns woven into the face of Woodberry 887. Clipper Seams if desired.

Checking evenness of roving with Belger Tester.

One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

Mt. Vernon-Woodberry Mills

Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST · NEW YORK

view, Wash., according to Mr. Ely, has definitely established the economic soundness of the use of the new process. The pilot plant was set up under the sponsorship of three firms that had been conducting research on the magnesia process.

Tunnel Contract Awarded in Hoberg Torula Yeast Plant

Construction was scheduled to begin in March on Hoberg Paper Mills' $2,500,000 torula yeast process project to cut sulfite pollution in the Fox River at Green Bay, Wis. The announcement was made by J. M. Conway, Hoberg president.

A contract was recently awarded to Chapel & Amundson of Green Bay to construct a 3,200-ft. tunnel connecting the firm's two mills in the Wisconsin city. The tunnel, costing $373,000, will supply steam from the paper division's boiler plant to operate the yeast plant, which is to be constructed adjacent to the Hoberg sulfite pulp mill. Completion is scheduled for fall.

The interior of the tunnel will be 6½ ft. square, and the roof is to be from 7½ to 15 ft. below the surface. It will proceed several blocks under city streets. In addition to the actual construction work, Hoberg has agreed to pay the full costs of restoring to previous good condition everything disturbed in the course of the job.

In building the tunnel, the contractor will excavate 40,000 cu. yds. of earth and use this dirt to fill low areas in the mill yard. This is more than 10 times as much earthwork as that done by the city last summer in paving 3,200 ft. of a Green Bay street. The tunnel itself will have floor and walls of reinforced concrete. This will require more than 2,800 cu. yds of concrete and 296 tons of steel.

Two other phases are involved in Hoberg's anti-pollution project, according to M. J. Auchter, vice president in charge of manufacturing. Major rebuilding must take place at the pulp mill so that spent sulfite liquor that now flows directly into the stream can be collected for processing. The yeast plant itself must be constructed and equipped for actually removing from the liquor the wood sugars, which consume the oxygen from the river water and thus destroy fish life. Orders for equipment to be used on these phases of the project are currently being placed.

Ferguson Predicts Utilization of Waste in South

President Roy K. Ferguson of St. Regis Paper Co. declared in Pensacola, Fla., recently that southern sawmills soon will find a profitable market for materials formerly wasted. He told a dinner group that he based his prediction on the results obtained from a project in which St. Regis is cooperating with W. T. Smith Lumber Co. of Chapman, Ala.

Sawmill slabs and edgings, previously considered waste, are being used for kraft paper. Mr. Ferguson spoke to a group of St. Regis directors and officials and civic leaders following a tour of the firm's extensive papermaking facilities. W. T. Smith uses an Andersson debarker—a Swedish development—in its operation.

Chips from salvaged wood alone at the Chapman plant are equivalent to about 18,000 cords of pulpwood annually, Mr. Ferguson said. "We feel confident," he continued, "that the improved usage of wood will add greatly to the over-all resources of the South." He revealed that negotiations are underway with other southern firms to obtain chips from slabs.

National Container Corp.
was to move into new executive offices at 7 Central Park West and 1834 Broadway, New York, N.Y., March 16. The space, occupying the upper floor of the former American Circle Building, will house the president, chairman of the board, treasurer, secretary, comptroller, national account sales division, vice president in charge of box shop operations, personnel, human and labor relations department, and general counsel.

CUTTING THE RIBBON as huge corrugator starts paper rolling through the press, John F. Connelly marks the reopening of Connelly Containers Co., Philadelphia firm that was destroyed by fire less than five weeks before; shown in the new Montgomery County plant with Mr. Connelly are (l to r) William T. May of Robert Gair Co.; Lester Kardon of United Container; Melvin Bricker of David Webber Co.; Dana Nelson of Fibre Board Products; Yale Mann of Seaboard Container, and Elliott Wilson of Gibraltar Corrugated Paper

Competitors Help in Connelly Rebuilding

Connelly Container Co. at Philadelphia resumed operations March 4 less than five weeks after its Southwest Philadelphia plant had been destroyed by a $1,500,000 fire. To mark the event John F. Connelly, president of the firm, pushed a button on a new corrugating machine at the new quarters on the site of the former Pencoyd Iron Works on the Schuylkill River in Lower Merion Township.

There to cheer were representatives of six competitors who helped the paper box firm resume operations in what Mr. Connelly called "a modern miracle." Also present were representatives of labor unions, banks, machine manufacturers, railroads, and Connelly employees, all of whom pitched in to help the firm.

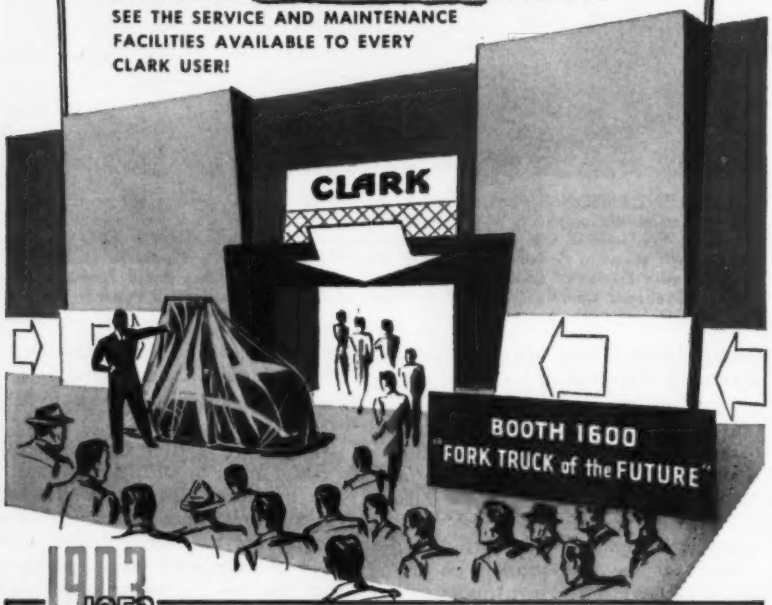
Some 90,000 sq. ft. of concrete had to be laid in order to put the old Pencoyd plant in order. The site, which had been unoccupied since 1946, covers about 25 acres and has been a landmark in the West Manayunk area for years. Since the fire 13 construction labor unions have been working around the clock in an effort to get the old iron works in shape. Equipment manufacturers offered Connelly $300,000 worth of hard-to-get machinery the day after the blaze.

Competitors supplied Connelly with

AT THE
GREATEST MATERIALS HANDLING SHOW
PHILADELPHIA, MAY 18th THROUGH 22nd, 1953

See CLARK EQUIPMENT IN ACTION!

- NEW MODELS — FORK TRUCKS, POWERIZED HAND TRUCKS, TOWING TRACTORS
- FOUR POWER UNITS — GAS, ELECTRIC, DIESEL, L. P. GAS
- FOUR DRIVE UNITS — STANDARD, ELECTRIC, DYNATORK and the NEW HYDRATORK
- NEW ATTACHMENTS — IN ACTION, HANDLING ROLLS, CRATES, BALES, ETC.
- See NEW CLARK MOVIE — "SAFETY SAVES," DRIVER TRAINING AND SAFETY
- And watch CLARK SERVICE in action! SEE THE SERVICE AND MAINTENANCE FACILITIES AVAILABLE TO EVERY CLARK USER!



1903 1953
FIRST FIFTY YEARS
CLARK EQUIPMENT
INDUSTRIAL TRUCK DIVISION
CLARK EQUIPMENT COMPANY
BATTLE CREEK 22, MICHIGAN
WRITE FOR FREE REGISTRATION TICKETS

paper boxes with the Connelly firm name imprinted during the interim between the fire and resumption of operations. These companies include: Robert Gair Co., Fibre Board Products Co., United Container, David Webber Co., Seaboard Container Corp., and Gibraltar Container Co.

Mr. Connelly declared that all the credit for his firm's reopening must go to the competitors, trade unions, and "others too numerous to mention who have helped us to perform this modern miracle." More than 200 employees went to work on production March 4, using the $500,000 worth of new equipment. Mr. Connelly reported that he hoped to have 400 at work within four weeks.

Eastern Executive Predicts Good Sales in 1953

John E. Massengale, vice president in charge of sales for Eastern Corp., recently predicted greater sales achievement in 1953. Speaking in New York, N.Y., he based his forecast on the fact that the first quarter of this year has already shown an improvement over 1952. He believes the improvement will continue into the second quarter.

Charts demonstrating production and consumption figures in the industry were presented by Harold Holden, president of Eastern.

U.S. Pulpwood Consumption, 1952 (millions of tons)

South	13.2
Pacific	4.5
Northeast	4.1
Lake States	2.9
Appalachian	1.6
TOTAL	26.3

U.S. Wood Pulp Consumption, 1952 (millions of tons)

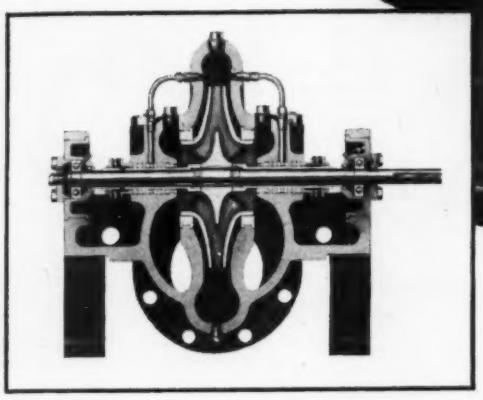
Sulfate	9.1
Sulfite	2.9
Groundwood	2.6
Soda	0.4
Semichemical and others	2.1
TOTAL	17.1

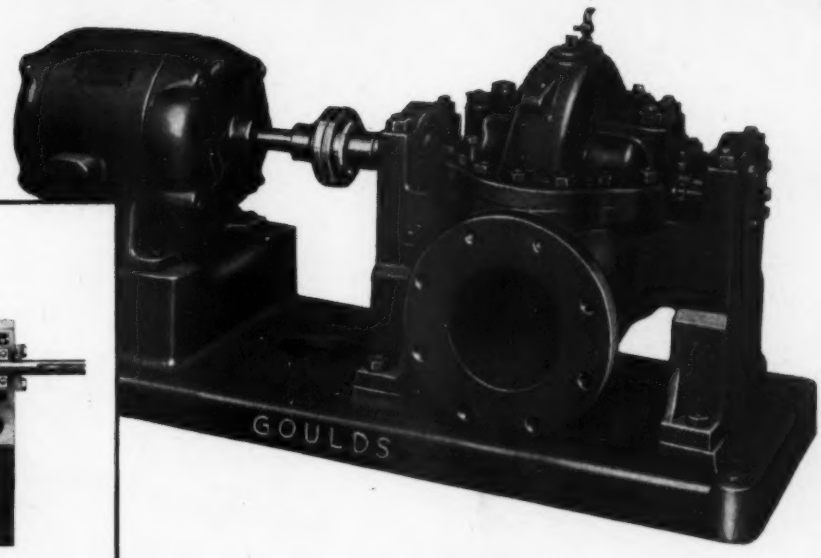
Great Northern Donates $5,000 to U. of Maine

The Department of Industrial Cooperation at the University of Maine, Orono, has announced that Great Northern Paper Co. has donated $5,000 to create two industrial research fellowships. Great Northern is the first firm to establish more than one such fellowship.

These grants, to be known as Great Northern Paper Co. Industrial Research Fellowships, make possible substantial financial assistance for graduate students engaged in advanced programs of study under the direction of members of the university staff. The nature of the projects is fundamental research and is determined jointly by the university and the donor. The projects are not confiden-

The new Goulds Fig. 3405 double-suction, single-stage, horizontally split casing centrifugal pump for general purpose pumping. 19 sizes. Capacities from 200 GPM to 6400 GPM. Heads up to 260 ft.





This new pump gives you 5 big cost advantages

The price you pay is only one element of the cost of a pump installation.

Good engineering practice also figures in the cost of pump breakdowns, low operating efficiency, change-overs to meet new conditions, replacement parts inventories, even the floor space the installation takes up.

Here's why the new Goulds centrifugal pump is designed to improve your cost experience in every one of those elements.

1. ***It combines seven design features that mean maximum operating efficiency and minimum maintenance.***

Every one of these construction features is standard with this new design. Together they offer you, without extra cost, a quality of service that's unique in its approach to general liquid handling.

a. Renewable stuffing box bushings.
b. Bearing housings sealed against moisture and dirt.
c. Cowl-type glands suitable for use with quenching liquids.
d. Stainless steel impeller keys.
e. Teflon water seal rings.
f. Die-formed stuffing box packing.
g. Corrosion resistant gland bolts.

2. ***Interchangeability of parts.***

With only three shaft and rotating parts assemblies to provide for 19 pump sizes and 38 pump combinations, this new design offers you a remarkable range of interchangeable parts. A glance at the interchangeability chart on page 7 of the descriptive bulletin will show you:

a. how this design gives you great flexibility in making field changes should your pumping requirements change;
b. why the first cost of this unit is so low due to standardization in manufacture; and
c. how this interchangeability helps to reduce spare parts inventories.

3. ***Compact construction.***

You will be particularly pleased with the short over-all length of this new design. Short bearing spans cut lengths as much as 50%. This means a real saving in floor space.

4. ***Flexibility of stuffing box.***

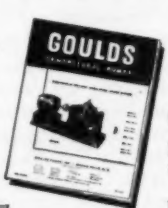
You can use either conventional stuffing boxes or mechanical seals depending on requirements. And you can change from one to the other in the field if need be.

5. ***Easy rotation change.***

A unique device, locking shaft sleeves, permits you to change from right-hand rotation to left-hand rotation or vice versa in the field without construction changes.

More than 50 years of experience in meeting industry's needs for general purpose centrifugal pumps come to a climax in this design.

GET FULL DETAILS **This 12-page illustrated bulletin, No. 721.6, covers the complete details of the new Goulds Fig. 3405, including specifications, interchangeability tables and performance curves. Be sure you have the whole cost-advantage story before you select another general purpose pump. Contact your nearest Goulds representative or mail the coupon below today.**



GOULDS PUMPS, INC., Dept. PI, Seneca Falls, N.Y.

Please send me Bulletin No. 721.6 describing the new Fig. 3405 centrifugal pump.

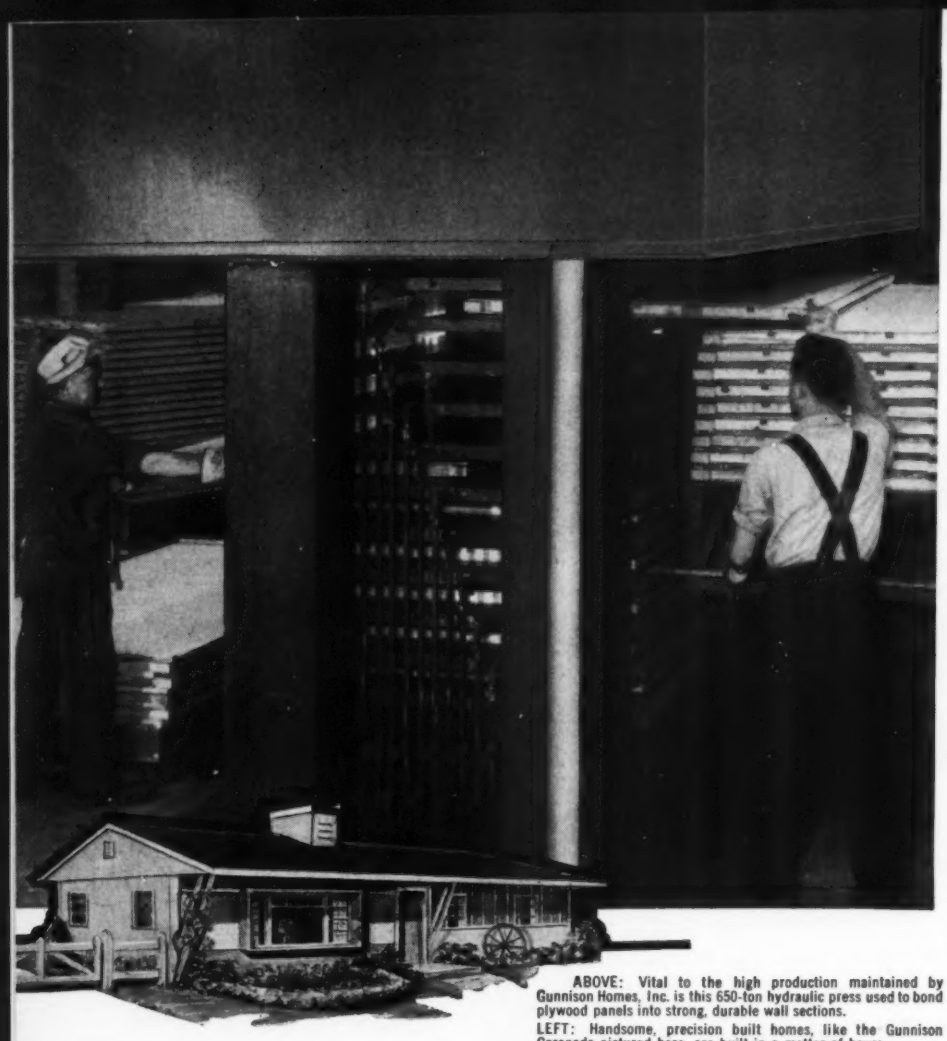
Name_____

Company_____

Address_____

City_____ State_____

Goulds PUMPS INC. Seneca Falls New York



ABOVE: Vital to the high production maintained by Gunnison Homes, Inc. is this 650-ton hydraulic press used to bond plywood panels into strong, durable wall sections.

LEFT: Handsome, precision built homes, like the Gunnison Coronado pictured here, are built in a matter of hours.

Answers a pressing need for Gunnison Homes, Inc. . . .

● Gunnison Homes, Inc., situated in New Albany, Indiana, is one of the leaders in the field of manufactured homes. Key to continuous production of precision built homes at the New Albany plant is the 650-ton hydraulic press, shown above, which was installed in 1947. This press processes ten plywood panels every cycle by the combination of heat and pressure . . . a tough job and one requiring reliable hydraulic performance to maintain production schedules.

STANOIL Industrial Oil was installed in the press when it was put into operation six years ago. STANOIL has stood the test of severe operation . . . with no evidence of oil deterioration being found during a recent inspection of the hydraulic system. Operation has been efficient. Minimum make-up oil has been needed to maintain the oil capacity of 450 gallons.

STANOIL
TRADE MARK
Industrial Oil

Find how STANOIL can benefit you by discussing this multi-purpose oil with a Standard lubrication specialist. You can contact him by phoning your local Standard Oil office. Or, write: Standard Oil Company, 910 S. Michigan Ave., Chicago 80, Ill.

What's YOUR problem?

Ralph E. Murnahan, of Standard Oil's Evansville office, is the lubrication specialist who keeps in constant contact with Gunnison Homes to make certain that there is no interruption of operation due to lubrication difficulties.

He is one of many lubrication specialists who make their headquarters in Standard's offices throughout the Midwest. These men have been specially trained in Standard's Lubrication Engineering Schools and, in addition, have a wealth of on-the-job experience.

To obtain the service of the lubrication specialist in your area, you need only call your local Standard Oil office. The lubrication specialist will discuss your lubrication problems with you . . . at no obligation to you, of course. He has a complete line of petroleum products to offer you, including:

SUPERLA Greases—Available in a wide range of consistency grades and in both lime-soap and soda-soap types. SUPERLA Greases cover a wide range of operations. These efficient products are comparable in quality with the highest type of special greases.

STANOLITH Greases—Because these unique lithium soap products possess the heat resistant properties of soda-soap greases and the water resistant properties of lime-soap greases, they offer a solution to lubrication problems caused by the presence of both heat and water.

STANDARD OIL COMPANY **STANDARD** *(Indiana)*

tial in that the theses or abstracts will be made available to the industry at large by publication in some recognized journal.

Gulf States Paper Gift Makes Expansion Possible at University of Alabama

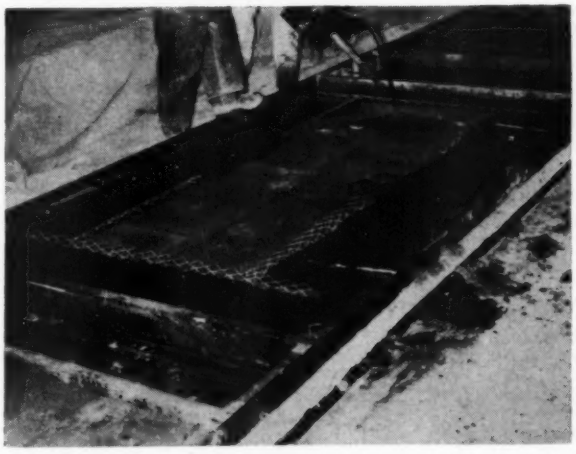
An initial gift of $35,000 by Gulf States Paper Corp., Tuscaloosa, will make possible an expansion of the University of Alabama pulp and paper technology program, it was announced recently by John M. Gallalee, president of the school. Dr. Gallalee reported that plans were being made immediately.

Gulf States officials said that the donation would be on an annual basis. The university plans to make a contribution of $10,000 each year and will provide additional building space for classrooms, laboratories, and offices. Mildred W. Warner, president of the paper firm, declared that her company feels that "the increasing importance of southern forest resources and expansion of the kraft industry in that section require improved production methods, new products and processes and technical personnel."

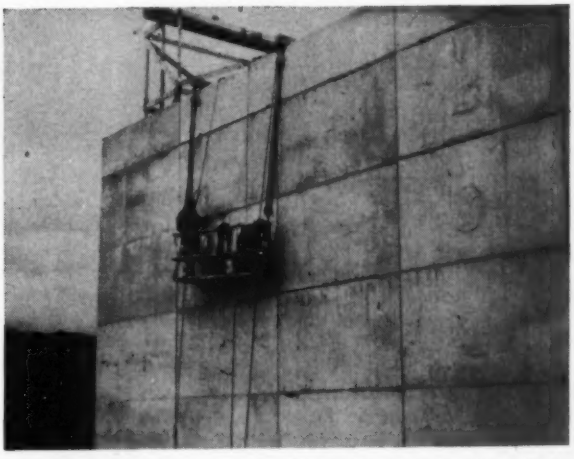
Dean Robert S. Brown, head of the School of Chemistry, Matallurgy and Ceramics, will be responsible for supervising and carrying out the expansion. He has declared that plans are underway to add professors and other technical personnel who are specialists in paper chemistry and production of pulp and paper from southern pine and other woods. Gulf States has agreed to make personnel available for lectures, consultation and research problems.

PLACEMENT OF WIRE mesh reinforcement, lifting hooks, and anchors in the casting bed

PUTTING IN the cellular glass insulating material after placing the first layer of concrete



WORKMEN PLACING vapor seal over the newly laid insulation prior to next layer of concrete



CALKING JOINTS after the panels have been anchored in place; panel size is 6 by 10 ft.

Precast Concrete Sandwich Panels as Used in B.C. Mill Construction

CONSTRUCTION ENGINEERS at the dissolving pulp mill of Columbia Cellulose Co. in Prince Rupert, B.C., faced peculiar problems of atmosphere and geography when they set about their task several years ago. It was their problem to construct non-load-bearing walls that would be both low in first cost and economical to maintain year after year. Ideally, such walls should be simple where fabrication is concerned, quickly erected, able to withstand the elements, resist fire, conserve heat, and exclude cold. (The $27,000,000 plant, which has a daily rated capacity of 200 tons, was dedicated on June 12, 1951; see THE PAPER INDUSTRY for August 1951, page 508.)

Major factors influencing the design of the plant, which consists of several large buildings, included high humidity due to the manufacturing process, the

inherent climatic conditions, high rainfall; the incidence of earthquakes, and the availability of labor and materials. The design engineers studied and analyzed 13 different types of wall construction before choosing precast concrete sandwich panels.

Effective strength

According to Charles H. Klotz, supervising engineer of planning and design for Celanese Corp. of America, tests made in the laboratories of Centre de Researches de l'Ecole Polytechnique at Montreal provided convincing proof of the compressive, shearing, and flexural strength of the panels. Writing in a recent issue of *Architectural Concrete*, Mr. Klotz declared that "the coefficient of heat transfer for a 5½-in. insulated concrete panel is 0.17 Btu per hour per square foot per degree F., whereas the coefficient for a 4-in. solid concrete slab is 0.82."

Most of the panels used at Prince Rupert were 6 ft. high and 10 ft. in width. The sandwich panels consist of a 2-in. layer of cellular glass insulating material between an outer layer of concrete 2 in. thick and an inner concrete layer 1½ in. thick. A concrete with 28-day strength of 3000 psi was specified.

Production

"Four production lines for the manufacture of the panels were established in a warehouse, which was the first of the plant structures erected," Mr. Klotz continues in his report. "The concrete floor of the warehouse was used as a casting bed. . . . Each production line was 200 ft. long and was made up of a series of 4 x 5½-in. channels placed on the floor 6 ft. apart. Wooden bulkheads were placed crosswise between the channels at 10-ft. intervals, thus dividing each production line into approximately 20 casting beds."

To serve as a separator between the floor and the underside of the panels, the area was sprayed with a mixture of kerosene and stearic acid before the concrete was put down. Inserts were located by nailing them to wooden plugs that had been provided in the floor.

"Each layer of concrete in the sandwich panels contains a mat of wire mesh," Mr. Klotz continues, "and the panels are tied together by channel-shaped strips of expanded metal that extend through the joints in the insulating material. The first layer of wire mesh was installed with the metal strips and necessary lifting hooks wired to it. The 1½-in. layer of concrete which formed the inside surface of the panel was placed first. Cellular glass insulation 2 in. thick was placed on top of this layer. Hot mastic was poured over and between the block to seal the spaces between, form a plane of cleavage, and act as a vapor barrier. Wire mesh and concrete for the outside layer were then placed, the concrete vibrated and screeded. Excess water was then removed with vacuum pads and the surface power floated."

To prevent fragile edges, an edging tool was used around each panel to create a beveled edge. Brooming the upper surface of the panel after floating created a rough texture for the outside wall of the buildings.

Following the above treatment the panels were carried by fork lift trucks to rack storage and further curing, after having been covered and steam cured for approximately 14 hours. They were removed from the casting beds by vacuum lifting pads. During the six-month construction period, the panels were cast during the day, cured at night, and removed from the forms the following morning.

Erection

Panels were delivered from the curing racks to the construction site by fork lift trucks and stored in racks adjacent to the wall. They were lifted as needed and raised into position by a rubber-tired mobile hoist that traveled along the edge of the roof.

A total of 3,589 panels was used in the steel framework buildings to provide 191,800 sq. ft. of wall area. The sandwich panels were erected at a cost of $2.10 (Canadian) per sq. ft.; the 4-in. solid panels cost $1.28 (Canadian) per sq. ft. The panels were fabricated by Creaghan & Archibald Ltd. of Montreal.

Canadian Glassine Opens New Plant

Canadian Glassine Co. has officially opened its new paper mill at Quebec City. Production at the $1,250,000 plant is expected to eventually total 20 tons per day. The mill produces greaseproof and glassine papers to be used as inner linings in packaging, as individual wrappers for boxed chocolates, as bottom wrappers for products of the baking industry, etc.

Bowater Joins Newfoundland Natural Resources Syndicate

Bowater Newfoundland Pulp & Paper Mills Ltd. is one of 20 firms that have joined to form an Anglo-Canadian syndicate for the purpose of surveying and exploiting certain areas in Newfoundland. The group, to be known as British Newfoundland Corp., will be incorporated in Newfoundland and will have offices in St. John's. An agreement has been reached with the provincial government.

British Newfoundland will spend at least $1,250,000 during a five-year period on exploration and examination of natural resources. Three additional such periods are contemplated.

Other firms associated in the venture include the following: N. M. Rothschild & Sons, Anglo-Newfoundland Development Co., Anglo-American Corp., Rio Tinto Co. Ltd., English Electric Co. of Commerce, Morgan Grenfell, J. Henry Schroeder Banking Corp., Hambros Bank Ltd., Prudential Assurance Co., and Imperial Chemical Industries.

Thiesmeyer Calls for Streamlined Papermaking

Calling hundreds of millions of dollars of equipment in Canada's chemical pulp and paper industry obsolete, Dr. Lincoln R. Thiesmeyer has predicted the day when wood will be fed into a pipe and removed as pulp—all continuously and at a relatively high speed. Dr. Thiesmeyer, president of the Pulp and Paper Research Institute of Canada, addressed a Rotary Club meeting in Toronto.

"How soon this will come depends very much on how much money is put behind the effort," he declared. "The knowledge is almost all there already." He pointed out that it will be some time before the industry can afford to change over to the new machines that research has developed. But new mills built within the next few years will be able to take full advantage of the new developments.

The machines of the future will cost less to construct, use less chemicals, steam and power and get more product for the same amount of wood. More wood will be cooked per day in smaller equipment.

Dr. Thiesmeyer reported that the Institute is "in the forefront on the basic knowledge needed to bring all this about. We have solved one of the age-old problems of the chemical pulping industry by a process, still confidential for patent protection, which will achieve more uniform cooking in a shorter period of time than is now the case."

In the future, he declared, chemical pulp mills will be operated from a central control board, and each day the operator, under instructions from management as to the type of pulp desired, will select and pull out a series of stops and then activate a switch to bring about the desired results.

Dr. Thiesmeyer also suggested that the science of silviculture would change its approach from concern about species of tree to emphasis on growing more useful fiber per acre.

Canadian Notes

Late Snows

in eastern Canada were expected to enable woods operators to get their entire pulpwood cut hauled before the spring break-up. Earlier in the season lack of

Get LONG-TERM PROTECTION with PALLADIUM* MASTICS

Maintain sound equipment at a fraction of the original cost!

TOWERS • STRUCTURAL STEEL
EVAPORATORS • DIGESTERS
COLD WATER LINES • HOT WATER LINES
BLOW TANKS • STORAGE TANKS
FILTRATE TANKS • FOAM TANKS • HOT WATER TANKS
DUCTS • PIPING • VESSELS
METAL ROOFS • MORTAR • MASONRY

PALLADIUM MASTICS offer complete pulp and paper mill INSULATION AND CORROSION PROTECTION

There's a Palladium Mastic specifically designed for long-life protection of every type of metal equipment and structure against the ravages of corrosion, whether caused by fumes, vapors, weather, condensation or chemicals.
Our engineers will be glad to consult with you about your plant and equipment.

*Reg. U.S. Pat. Off. No. 440107

Every Palladium Mastic installation is applied by experts. We back our workmanship with periodic inspection by enginers. Write for details and literature.

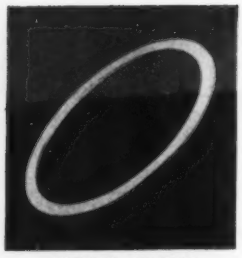
MASTIC Palladium PRODUCTS

Palladium Mastic Corporation of America

Rockefeller Center • 620 Fifth Avenue • New York 20, N. Y.

GARLOCK BITAN Leather Cups, Packings and Gaskets

GARLOCK CHEVRON Hydraulic Packings



GARLOCK GUARDIAN Asbestos-metallic Gasket

GARLOCK KLOZURE Oil and Grease Seals for Bearings

GARLOCK LATTICE-BRAID Rod and Shaft Packings

BITAN*
CHEVRON*
GUARDIAN*
KLOZURE*
LATTICE-BRAID*

These familiar brand names are registered trade-marks belonging to The Garlock Packing Company. They are never to be used as generic terms to designate types of products and are properly used only to denote products manufactured by Garlock.

BITAN Leather Packings, CHEVRON Packings, GUARDIAN Gaskets, KLOZURE Oil Seals and LATTICE-BRAID Packings are all exclusive products of Garlock's own factories. So, wherever you see these trade-marks you can be sure that the products with which they are used are of proper design and are manufactured to the highest quality standards. They will give you long, dependable service.

*Trade-Mark Reg. U.S. Pat. Off.

Branch Offices in Principal Cities

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK
In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

GARLOCK® PACKINGS, GASKETS, OIL SEALS, MECHANICAL SEALS, RUBBER EXPANSION JOINTS

snow and then rain had slowed hauling operations considerably.

TCF of Canada Ltd.
reports that its Cornwall, Ont., plant for the manufacture of transparent cellulose film by the viscose method is nearing completion. Production is expected to start early this summer.

Smead of Canada Ltd.,
a subsidiary of Smead Mfg. Co. of Hastings, Minn., is opening a plant at Toronto. The firm's line of filing containers will be manufactured in leased space.

Somerville Ltd.,
London, Ont., manufacturer of paper containers, boxes and cartons, is arranging to construct a branch plant at Toronto. A 7½-acre site has been purchased for the project, which will cost approximately $600,000. It is anticipated that the plant will be in production in September, with 150 workers employed.

Continental Can Co. of Canada Ltd.
has purchased the Hamilton, Ont., firm of Perga Containers Ltd., manufacturer of paper milk bottles, milk shake cups, milk bottle caps, and automatic filling and sealing equipment.

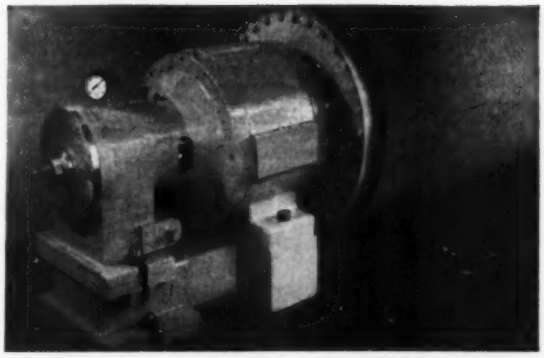
Special Coronation Paper Colors
recently defined by the British Colour Council have Canadian paper mills preparing for a rush in special Coronation orders. Twenty-eight colors have been made "official" for the event. Howard Smith Paper Mills Ltd. recently sent out a mailing featuring its Mayfair Cover line, consisting of 12 regular colors. The cover has a die-cut of the Crown against a strip of Coronation Red and a strip of Coronation Blue tipped on insde.

U. of Maine Lecture Series

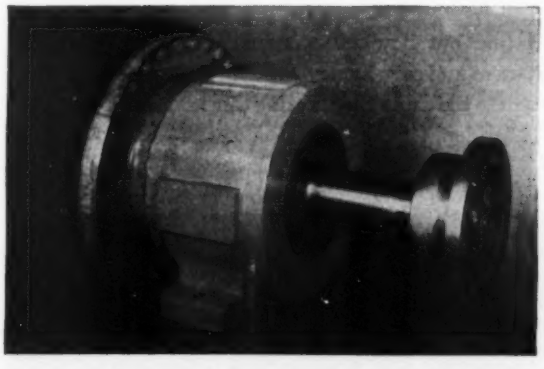
Lectures on various technical aspects of pulp and paper mill operations are being presented during the spring semester at the University of Maine, Orono. The series is sponsored by the pulp and paper division of the Chemical Engineering Department. Prof. Lyle C. Jenness heads the division. The lectures were arranged by Charles M. Howell, lecturer in paper technology.

The remaining lectures are as follows: April 14—"Coated Papers and Coating Processes," Charles D. Russell, S. D. Warren Co.; April 16—"Paper Drying Equipment and Systems, Including Yankee Dryers," Charles S. Adams, Rice Barton Corp.; April 21—"Book Papers," speaker to be announced; April 23—"Paper Machine Hoods, Hot Air Systems, Mill Ventilation," Jack Lynch, J. O. Ross Engineering Corp.; April 28—"Yankee Machine Glazed Paper," Roy

This new, improved Suction Press Roll steps up efficiency... profit!



Note these improvements: Stainless Steel end rings, stainless studs and nuts, generous size anti-friction bearings and housings, and positive locking strips for bonding rubber to centrifugally cast bronze shell.



Rugged steel forgings, fewer working parts and easily replaced packing are only a few of the features of the new Manchester rubber-covered drilled suction press roll.

MANCHESTER has designed this new Suction Press Roll that speeds up production, improves paper quality, gives you greater efficiency on the wet end, and increases your profits.

This rubber-covered drilled Suction Press Roll has every modern engineering advantage you need for top quality and full production. It will reduce your fuel costs in the dryer operation and more than repay the investment.

Write for our new illustrated catalog; and ask us to tell you more about the operating advantages of the Manchester Suction Press Roll.

A Few Other Manchester Products

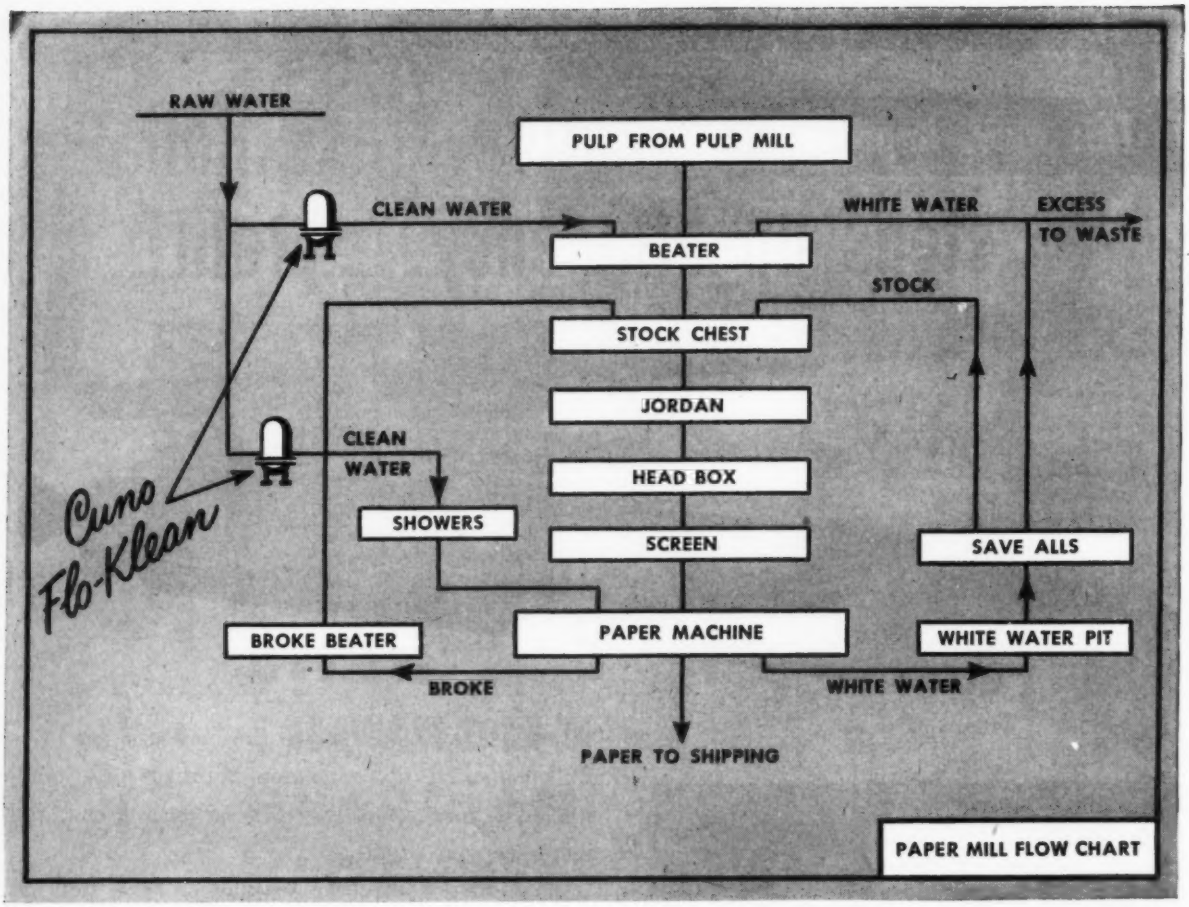
Drum Winders • Adjustable Shake Motion • Pope Type Reels Paper Machine Drives • Size Presses • Rubber-Covered Drilled Suction Drum Rolls • Drilled Suction Couch Rolls • Cylinder Moulds Complete Fourdrinier • Roll Grinding

• • • • • • • • •

THE MANCHESTER MACHINE COMPANY

1708 CENTRAL AVENUE • MIDDLETOWN, OHIO

SPECIALISTS IN PAPER MILL MACHINERY AND COMPLETE REPAIR SERVICE



Plan for longer uninterrupted production

When paper and pulp mills have clogged showers or damaged wet felts and Fourdrinier wires, it takes time and money to get going again.

Paper and pulp men have learned from experience that they can avoid costly down-time by installing Cuno FLO-KLEAN filters in their water systems. FLO-KLEAN filters remove harmful solids from river, lake or well water before equipment can be damaged.

You can install a FLO-KLEAN and forget about down-time caused by dirty water. Automatic and continuously self-cleaning, FLO-KLEAN filters are available to handle between 200 and 100,000 gallons of water per minute—with no interruption of flow, and no loss of backwash water. Pressure loss is negligible in this corrosion- and abrasion-resistant unit.

To find out how FLO-KLEAN can protect your equipment and save money write for free FLO-KLEAN bulletin to the Cuno Engineering Corporation, Dept. 393F, Meriden, Conn. F.3.3

CUNO

ENGINEERED FILTRATION

Removes More Sizes of Solids From More Kinds of Fluids

AUTO-KLEAN (disc-type) • MICRO-KLEAN (fibre cartridge) • FLO-KLEAN (wire-wound)

L. Davis, Detroit Sulphite Pulp & Paper Co., and April 30—"Paper Machine Drives," speaker to be announced.

May 5—"Research in Papermaking," J. J. Eberl, Scott Paper Co.; May 7—"Motor and Electrical Equipment Selection, Operation and Maintenance," M. H. Fisher, Westinghouse Electric Corp.; May 12—"Newsprint Papers," Henry W. Fales, St. Croix Paper Co.; May 14—"Paper Machine Reels and Rewinders," E. J. Ward, Cameron Machine Co.; May 19—"Personnel Program for a Paper Mill," L. F. Thompson, West Virginia Pulp & Paper Co.; May 26—"Finishing and Converting Papers," speaker to be announced, and May 28—"Paper Finishing Equipment," Charles N. Nitchie, Samuel M. Langston Co.

Output Reduction Reported by Kraft Paper Mills

A decline in government orders has been a major factor in the recent cutbacks in the production of kraft paper mills, according to trade sources reported in the New York *Journal of Commerce*. Some mills may have to cut down on wrapping paper production.

Another factor in the reduction has been the increase in annual output stemming from the operation of new kraft paper mills in the South. And lastly, the European market has been easy, and foreign producers have been seeking business in the American market.

Some dealers report that a few kraft wrapping paper mills have been seeking business in order to keep their paper machines operating at current levels of production.

Wellington Fund Increases Stock Investment in Industry

The $246 million Wellington Fund with offices in Philadelphia increased its common stock investment in the paper industry during the last half of 1952 to $6,168,375. This represents an increase of $1,053,275 over the Fund's $5,115,100 in paper equities six months previously.

Purchases were made of the following paper common stocks during the last half year: 600 shares of Crown Zellerbach Corp.; 18,000 shares of Rayonier Inc.; 1,000 shares of Scott Paper Co., and 1,500 shares of Union Bag & Paper Corp.

Eight firms were represented in the paper group on December 31. The largest of these investments consisted of 18,000 shares of Scott. Other holdings in the group included: 16,000 shares of Crown Zellerbach; 17,500 of Union Bag & Paper; 14,000 of International Paper Co.; 30,000 shares of Marathon Corp.; 10,000 shares of Weyerhaeuser Timber Co.; 18,000 shares of Rayonier, and 10,000 shares of Kimberly-Clark Corp.

Mando Forester Urges Long-Range Thinking in Forestry Development

LONG-RANGE THINKING toward the goal of developing the potential of Canada's forest resources and forest industries was stressed March 5 by George B. Amidon, director of forest management for Minnesota & Ontario Paper Co. He addressed the 16th annual convention of the Ontario & Manitoba Council of Pulp, Sulphite and Paper Mill Unions. The meeting was at Kenora.

More than 100 delegates, representing 10,600 workers, heard Mr. Amidon say that Canada's forests will be of ever increasing value to the people of Canada in years to come if economic conditions are such that the future development of these forests continues to be commercially feasible. "The supply of raw material," he said, "seems to be the only limiting factor on the use of Canada's forests, providing that this raw material can be delivered to the mill at costs that are comparable to those of other regions and that the output of our forests can be economically converted into useful products."

G. B. Amidon

Mr. Amidon pointed out that the pulp and paper industry of Canada now creates one-quarter of the nation's wealth and is the nation's only $1 billion industry. Further, he expects that these industries will become of even greater significance to the economy of Canada.

Well managed forest regions, he continued, will pay tremendous dividends in terms of permanent industries, stable employment, a more healthy economy, and a better place in which to live for our children and for their children.

Proper management

Mr. Amidon declared that one of the main keys to future perpetuation and growth of Canada's leading industry is proper management of the nation's forests. Intensively managed forest units will grow twice as much wood as unmanaged lands, he said, and if practiced generally will perpetuate our forest resources.

In showing how forest management works, Mr. Amidon explained just what Mando and its Canadian division, The Ontario-Minnesota Pulp & Paper Co. Ltd., are doing on lands under their jurisdiction.

Threefold job

The speaker reminded his audience that the job of organized forestry is threefold: (1) protection of the forests from fire and insects; (2) havesting timber at the proper age—after it matures and before it deteriorates, and (3) establishing a new timber crop after the old stand has been removed. This can be done through natural reseeding and/or planting.

In Ontario, Mando maintains four management areas or limits. These limits have been further subdivided into smaller sustained yield cutting units. At the present time the company has 22 of these units in Canada. They vary in size from about 20,000 acres to 60,000 acres. The units supply mills at Kenora and Fort Frances, Ont. About 170,000 cords of wood annually, or 50 per cent of the firm's Canadian production, comes from these sustained yield limits. This means, if these practices are applied to the forests of Canada during the next 25 to 50 years, they could support an industry twice as large as the present one—provided, of course, that economic conditions are favorable.

Alaska Senate Favors Japanese Plan

Alaska's Senate has gone on record in Juneau in favor of the proposed cutting of timber in the territory's national forests for use by Japanese industry—providing it is done through an American company. A Japanese delegation recently toured the forest regions of southeastern Alaska preliminary to possible negotiations.

Senate approval came in a memorial to Congress that passed without a dissenting vote. It said: "There seems to be some opposition on the part of lumbermen in the Pacific Northwest to the development of Alaska timber resources, based on a fear that products will go to Japan and compete with products produced in the Northwest." It cited forests as one of the territory's greatest resources and declared, "if the territory's forests are to be used for the benefit of Alaska and the nation, the surplus must enter world trade in competition with products from other areas."

Canadian Association Starts School Conservation Project

Continuing its year-round program of conservation through education, the New Brunswick branch of the Canadian Forestry Association has inaugurated a forest conservation contest among the province's intermediate and high school students.

K. L. Golding of Fredericton, president of the branch, declared that the

contest is to be on a classroom basis, with a total of $500 in prizes being offered. Among the projects which classes or groups of classes may undertake and enter are: collections of winter twigs of deciduous trees, suitably mounted and classified; collections of cones and seeds of coniferous trees, classified and mounted; school ground landscaping programs, and an illustrated report on the history of lumbering in New Bruswick.

Experts Find Solution to Wisconsin Insect Problem

Entomologists at the University of Wisconsin, Madison, have found a solution to an insect problem in Wisconsin's paper industry through the use of BHC, one of the newest chemical "bug" killers.

The scientists, Roy D. Shenefelt and Wakelin McNeel Jr., report that the new chemical will do a good job of controlling the bark beetle and wood borer if the BHC spray is applied within 48 hours after the pulpwood is cut. Experiments showed also that the spray gave good insect control in wood stored for two years. The chemical, in addition, kept down wood-destroying fungi, giving at least 80 per cent control of decay for up to nine months of storage.

Pulpwood is sprayed until the logs drip with a mixture of 2½ lb. of 13½ per cent gamma isomer BHC, 1/6 pint emulsifier, and 2 qts. benzene in 10 gal. water. The entomologists report that the cost of spraying one cord of pulpwood is about $1.00. It is hoped that the cost will be lowered as the process is developed.

Spacing Important in Seeding, Test Shows

Twenty-five years after planting, jack pine seedlings set out at a spacing of 6 by 6 feet have developed more satisfactorily than others planted at spacings of 4 by 4 or 8 by 8 feet. This was shown as the result of a test established as an administrative study on the Huron National Forest in Michigan. The site chosen was "fairly representative of the poorer, sandy planting chances on the outwash plains."

In the spring of 1925, 100 jack pine seedlings were set out in furrows by the bar-slit method at the three spacings in three one-acre plots laid out side by side on a level area of Grayling sand supporting a growth of scrubby northern pin oak. Pre-planting release was not necessary, but all overtopping oaks were cut in 1939. Fail spots were replanted in 1926 and 1927.

Jack pine seedlings planted at the 6 by 6 foot spacings had grown the best and are about ready, both silviculturally and economically, for a light post or pulpwood thinning. Seedlings originally spaced at 4 by 4 foot intervals fully occupy the space, but the trees are too small to be thinned commercially. On the other hand, the seedlings planted at the 8 by 8 foot spacing have developed orchard-like crowns and probably will not produce maximum yields at maturity.

Lake States growth variation studied

How much the juvenile growth rate of common Lake States conifers varies by species, even on the same site, is illustrated by a study made on the Kawishiwi Experimental Forest in northeastern Minnesota. In 1937, 150 trees each of six species were planted with mattocks on an upland rocky site using stock produced from indigenous seed in a small local nursery. Trees of each species were planted at 4 by 4 foot spacings on sub-plots of 25 trees each.

A complete check of the plantation made in 1940 and again when the stand was 10 years old showed that the fastest growing species were jack pine and tamarack, with no significant difference between them. Spruce showed the poorest growth, although black spruce grew appreciably faster than did white spruce. White pine and red pine grew at an equal rate, both showing better than the spruces.

Knowledge of the juvenile growth rate of several species on a site suitable for several of them can help planters decide which species to choose. Such information also provides clues as to the number of early releases that may be necessary.

Forestry Notes

Nearly $2 Billion
in products during 1952 was produced by the Oregon and Washington forest industries. According to the Industrial Forestry Association, this was an all-time high. The two-state industry employed 170,000 persons and paid nearly $700,000,000 in wages.

Kimberly-Clark Corp.,
Neenah, Wis., has planted a tree crop that won't be harvested until the year 2000. The firm's woodland department set out 1,000,000 seedlings in lands owned by the corporation in Upper Michigan and Northern Wisconsin. In the Marenisco, Mich., and Crandon, Wis., areas tree-planting machines were used.

Delay is Expected
in the adoption of the complete use of the cubic foot method of timber measurement in British Columbia. The Social Credit government, which supports the method, hopes to replace the board foot system that has been in use in the province 40 years. Forest industries oppose the method because of the extra cost and the fact that all past cost data would be nearly useless.

An Oriental Scale Insect
that attacks conifer trees has been discovered near Baltimore, infecting Austrian pines. This is the first record of this pest in the United States, according to Dr. William W. Cantelo.

Great Northern Announces Manufacture of Newsprint from Hardwood

OFFICIALS of Great Northern Paper Co., Millinocket, Maine, announced March 10 that their firm has succeeded in developing a low-cost hardwood pulp suitable for extensive use in the manufacture of newsprint.

The answer has been found in pretreated hardwood groundwood, according to M. C. McDonald, president of the company. Successful experiments, he declared, were conducted during 1952. Great Northern has for the past several years conducted an extensive program and study of experimentation on the various commercial and experimental methods of pulping hardwood.

Great Northern is producing regular newsprint by a process in which hardwood and softwood pulps are mixed together. Just how the process works, the firm isn't saying, but it does explain that the hardwood is pre-treated by a method that involves pressure vessels.

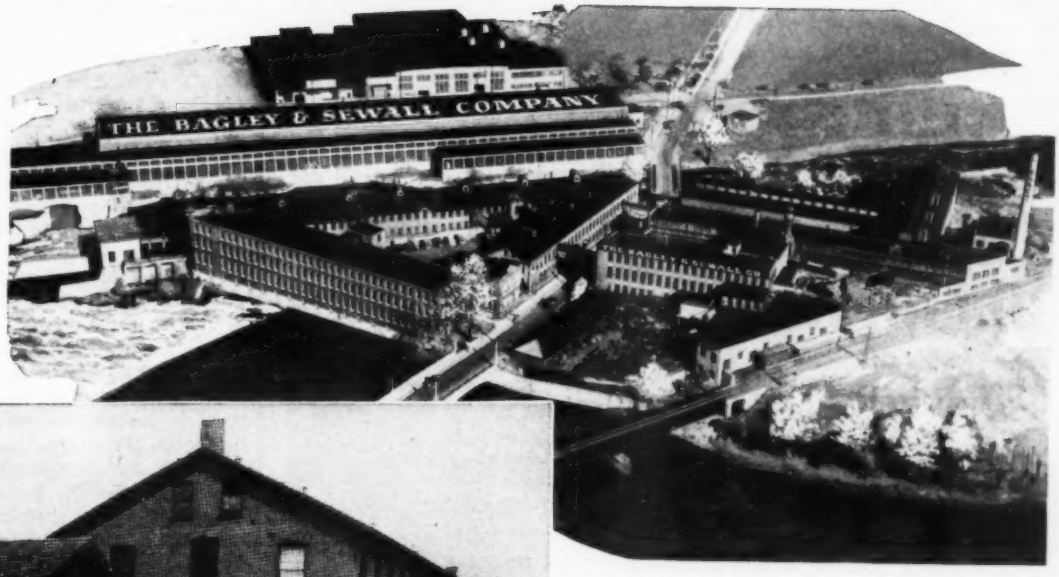
Mr. McDonald reported that his firm is going ahead with expansion plans, part of which include facilities for the new process. Construction has already started on a 50-ton hardwood groundwood plant at East Millinocket as part of the over-all $32,000,000 program.

Government Loan for Newsprint Mill Urged

A government loan for construction of a newsprint plant using timber from Alaska's Tongass National Forest has been proposed by Senator Case (R., S.D.). He reported that a bill he has prepared would authorize the loan and would save timber from the forest in southeastern Alaska for that purpose.

The legislator said that approval of the bill would increase United States newsprint production 10 to 20 per cent. He proposed that a sufficient amount of timber be set aside to supply a privately owned and operated plant of 500- to 700-

OFFICE AND BUILDINGS 1953



OFFICE AND MACHINE SHOP 1860-1896

- **HIGHER SPEED**
- **HIGHER PRODUCTION**
- **AT LOWER COST**

Back to about 1890 in our history, on the theory, "The faster the operating speed, the lower mill operating costs," Bagley & Sewall designed and built much wider and faster running paper machines than thought possible at that time.

Today, Bagley & Sewall's newest designs are still setting the pace in wide and faster running paper machines. With the most modern facilities and having one of the largest and best equipped machine shops and foundry capable of producing papermaking machinery, makes this possible.

Let our long and successful experience in papermaking machine design and manufacture help with your mill problems or new mill requirements.

100TH ANNIVERSARY 1853 1953

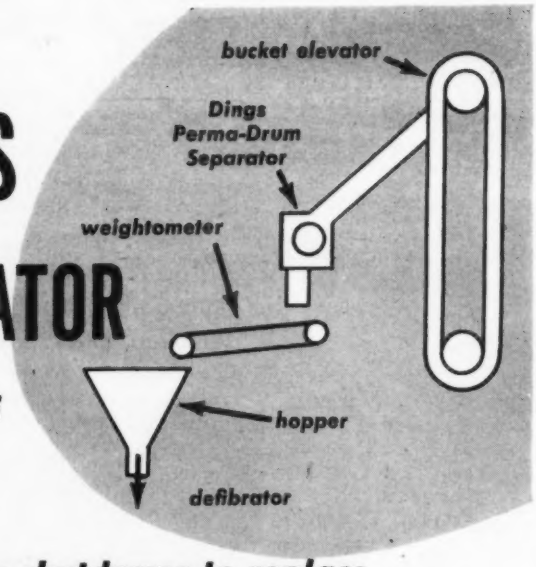
designing and building paper making machinery

BAGLEY & SEWALL

WATERTOWN • NEW YORK

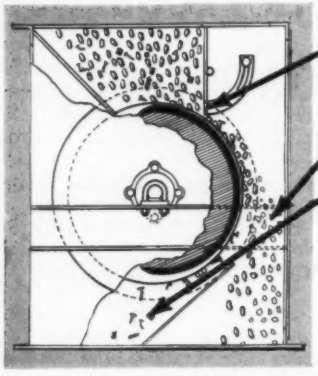
Foreign Representative • **CASTLE AND OVERTON, Inc., 630 Fifth Avenue, New York 20, N.Y.**

from
DINGS
to
DEFIBRATOR
... an
IRON-FREE
FLOW



... No more shutdowns to replace iron-damaged defibrator plates at National Container Corporation of Wisconsin

Chips are chute-fed from a bucket elevator, into a DINGS Magnetic PERMA-DRUM® Separator.



Here's what happens:

1. Tramp iron is held fast to revolving drum shell by pull of stationary, non-electric permanent magnet.
2. Chips flow over drum shell in normal trajectory on way to defibrator.
3. Tramp iron is discharged separately when it passes out of magnetic field.

The DINGS "JOB SELECTED" Magnetic Separator performs this vital job as no other piece of equipment could. Write for Catalog C-1100-A for more detailed information on PERMA-DRUM® Separators.

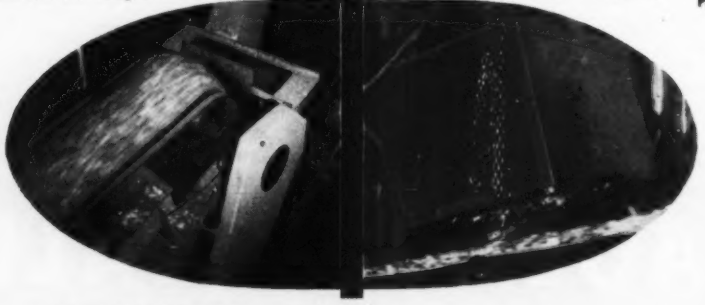
For other iron problems DINGS will gladly recommend the right "job selected" magnetic equipment.

Other DINGS MAGNETS in Paper Mill Work ...

Non-electric permanent PERMA-PULLEY® is ideal for burden depths up to 3 inches. Electro-magnetic pulleys available for deeper burdens.

This suspended rectangular magnet is used for iron removal in a southern paper mill. Belt speed was too fast for effective use of magnetic pulley.

PD-1



FIFTY YEARS OF RESEARCH — LEADERSHIP

DINGS MAGNETIC SEPARATOR COMPANY
4762 W. Electric Ave.
Milwaukee 46, Wisconsin

Dings MAGNETS

ton capacity. The private firm would put up not less than 40 per cent of the cost. The RFC would lend the remainder.

Quebec Newsprint Price Rise Confirmed

Premier Maurice Duplessis has confirmed reports that Quebec newsprint manufacturers planned to increase by $10 a ton the price of their newsprint to Canadian consumers effective April 1. The former Canadian basic price was $112 per ton.

Buyers in Quebec and Ontario newsprint mill towns, however, pay $5 less, in non-mill towns $3 less. The proposed increase adds $10 to these figures. Just prior to the announcement by Premier Duplessis, the 10 per cent sales tax on newsprint sold to Canadian publishers was removed. The increase, therefore, cancels out the effect of that removal.

February Newsprint Statistics

Production of newsprint in Canada (including Newfoundland) during February amounted to 439,167 tons and shipments to 408,610 tons. Output in the United States was 82,892 tons, and shipments were 83,208 tons, making a total North American production of 522,059 tons and shipments of 491,818 tons. This compares with continental production of 552,594 tons and shipments of 538,331 tons in February 1952. These figures were released by the Newsprint Service Bureau, New York, N.Y. (There was one work-day less in February 1953 than in February 1952).

The Canadian mills produced 15,484 tons less in the first two months of this year than in the corresponding period of 1952, a decrease of 1.7 per cent. The output in the U. S. was 15,294 tons, or 8 per cent, below that of the first two months of last year, thus the total continental decrease amounted to 30,778 tons, or 2.7 per cent.

Stocks of newsprint paper at the end of February at the Canadian mills were 159,082 tons and 11,291 tons at U.S. mills, a combined total of 170,373 tons. This compares with 140,132 tons on January 31, 1953, and 151,155 tons at the end of February 1952.

Control of Wood Shrinkage and Expansion Announced by Upson

Development of a new process to eliminate expansion and contraction of wood and other cellulose fiber materials because of atmospheric changes has been announced by the Upson Co. of Lockport, N.Y. The process involves treating cellulose fiber material with a chemical compound formerly regarded as an undesirable by-product of alkyd resin manufacture.

The simplest methods of treatment are

by immersing or spraying. But in papermaking, according to Dr. W. P. Ericks, Upson's research director, the compound can be added to the beater stock in a closed board mill operation. He called the process "a basic development of far-reaching importance to the . . . pulp and paper industry."

Customs Court Cases

The United States Customs Court has decided an important test case involving the dutiable value of Finnish wrapping papers, chiefly kraft, holding that the paper was undervalued by an attempt to deduct Finnish inland freight from the dutiable value, according to a report issued by Warren B. Bullock, manager of the Import Committee of the American Paper Industry. The issue dates back to 1948, and the decision will apply to more than 2,000 importations in which the claims of importers for lower duties had been rejected by Customs officials and appealed to the court.

Among the protests filed with the court are five covering shipments of decorative paper for box covering classified for duty as articles of coated paper at 5 cents per pound and 10 per cent, but claimed by importers to be dutiable as photographs at 12½ per cent because the design was produced from plates made by photography.

Industry Notes

Nekoosa-Edwards Paper Co.,
Port Edwards, Wis., is again offering cash grants of $300 each to employees for construction of new homes for their own use in Nekoosa or Port Edwards. The program was started in 1946. Since that time a total of 99 homes has been built, representing a total of $29,700 in grants.

Soriano & Co.
will construct a pulp and paper mill in the southern Philippines next year to supply domestic needs and to provide exports of newsprint and other papers. The mill is to be built on the northeastern coast of Mindanao Island, whose untapped forests will be the principal source of wood supply. Daily production capacity will be about 200 tons.

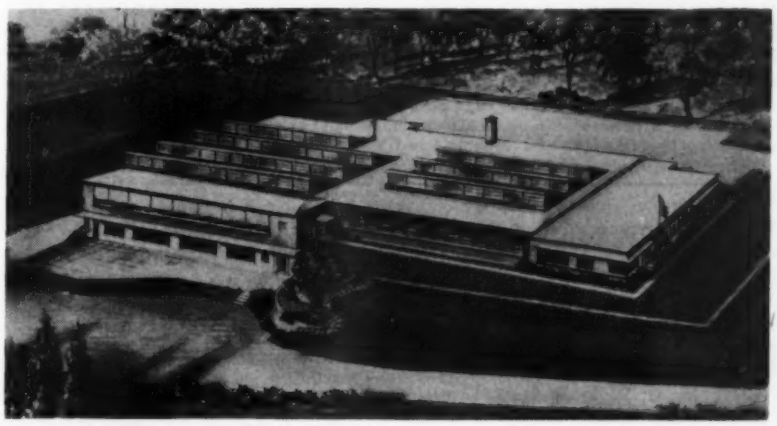
Rayonier Inc.
has announced the establishment of the Rayonier Foundation to provide charitable and educational contributions. Fellowships and scholarships will be established at various universities, particularly in the Pacific Northwest and the southeast.

Costa Rica's First Paper Mill
makes kraft from Abaca fiber. Vast quantities of the material, from which rope is made, were too short for cordage and were being disposed as waste. However, upon completion of scientific testing in England, it was found that paper made from 100 per cent Abaca fiber is stronger than that made from 100 per cent kraft pulp.

Bemis Bros. Bag Co.
of St. Louis has been awarded an American Heritage Foundation prize for nonpartisan political activity in the register-and-vote campaign of last November's election. The firm was one of 42 business enterprises in 19 cities cited.

Weyerhaeuser Timber Co.
has been named one of the top winners in the *Saturday Review of Literature's* first annual awards for distinguished advertising in the public interest. The firm's full-color advertisements depicting Pacific Northwest tree farms won fourth place.

Gardner Board & Carton Co.,
Middletown, Ohio, and its wholly owned subsidiary, The Manchester Machine Co., are distributing nearly $100,000 in back pay to employees. The back pay represents a 2 per cent pay increase retroactive to August 4 that was part of new union contracts negotiated last summer. Until recently, the increases were pending approval by the Wage Stabilization Board.



DOUBLED MANUFACTURING FACILITIES for The Foxboro Co. Ltd., Montreal, has resulted from the new plant extension shown at the left; the project, the second expansion program completed in the last five years, provides 23,000 sq. ft. of additional space for the production of Foxboro instruments

Permutit Executive Sees Rapid Advance in Boiler Operations

Experience and research in efficient boiler operation at high pressure has indicated the importance of maintaining silica contents in boiler salines at low levels, not over 5 ppm. In a paper presented before the American Power Conference in Chicago March 27, Martin E. Gilwood, director of research for The Permutit Co., stated that, "higher silica levels result in solution of silica in the steam and subsequent deposition of silica on the turbine blades in the low pressure stages of the turbine."

Mr. Gilwood predicted that in the near future at pressures of 1800 to 2400 psi and higher the maximum silica content permitted would be less than 1 ppm. Continuing, he said, "since the make-up water is concentrated many times in the boiler, it has become common practice to specify that the treated make-up water should contain no more than 0.1 ppm. of silica."

These and other conclusions were discussed in the presentation. Mixed bed and two-step demineralization by ion exchange are two processes that can be used to reduce the dissolved silica and solids to meet exacting specifications for high pressure boiler feedwater. In fact, the dissolved silica can be reduced to levels approaching 0.01 ppm.

Summarizing, Mr. Gilwood declared that "commercial development of high capacity ion exchange demineralizing apparatus now offers the possibility of producing economically water low in both electrolyte content and dissolved silica. In the majority of future installations, low-cost demineralization by ion exchange will be used in place of expensive evaporators for the treatment of high pressure boiler feedwater."

Morden Machines Reviews Successful Year

Morden Machines Co. of Portland, Ore., has reported a successful sales year in 1952, according to R. Burke Morden, president. Nearly 100 Stock-Maker installations were made.

Orgon Corp. of Fitchburg, Mass.,

DISTRIBUTORS AND FACTORY representatives of Goulds Pumps Inc. attending the recent Engineering Line Eastern Division Regional Sales Conference in Seneca Falls, N. Y.; the firm is scheduling a series of two-day meetings to acquaint salesmen and distributors with new products; such gatherings have been held in Chicago, Tulsa, Houston, and Atlanta

Morden sales representative in the northeastern states, has had installations in the following mills during the past year: West Virginia Pulp & Paper Co., Williamsburg, Pa.; Fraser Paper Ltd., Madawaska, Maine; S. D. Warren Co., Cumberland Mills, Maine; Hollingsworth & Vose Co., East Walpole, Mass.; American Writing Paper Corp., Holyoke, Mass.; Claremont Paper Mill, Claremont, N.H.; Eastern Corp., South Brewer, Maine; Tileston & Hollingsworth Co., Boston, and Coy Paper Co., Claremont, N.H.

Dan B. Chapman of Appleton, Wis., Morden sales representative in the Midwest, reports installations in nine mills in that area. Other Stock-Maker installations in 1952 were made on the West Coast, in Mexico, Israel, Japan, Brazil, Canada, England, France, Sweden and Belgium.

Nalco Promotes Three

National Aluminate Corp. of Chicago recently announced the promotions of *HERMAN R. POWERS, DR. DAVID G. BRAITHWAITE,* and *GAGE AVERILL,* each to the post of assistant vice president. National Aluminate is the manufacturer of Nalco water treatment chemicals, petroleum catalysts, fuel oil treatments, and paper process chemicals.

Mr. Powers has been field manager for industrial sales and service since June 1951. Prior to that time he was district manager in the Pittsburgh area. Dr. Braithwaite, Catalyst Division production manager, has been with the firm for more than 10 years. Mr. Averill joined the Catalyst Division as sales manager in 1949. Prior to that time he was with American Cynamid Co.

Lanston Monotype, Cuno Engineering Planning Merger

Lanston Monotype Machine Co. of Philadelphia and Cuno Engineering Corp. of Meriden, Conn., are planning to merge into Lanston Industries Inc. Lanston Industries is now a holding company recently incorporated in Virginia to effect the merger of Lanston Monotype with Cuno.

Products manufactured by Lanston include Monotype typesetting and typecasting equipment, Monotype-Huebner overhead camera and photo-composing machines, and Barrett adding and listing machines. Cuno manufactures and sells industrial filters.

R. F. Vokes

L. A. Moore

Black-Clawson Appointments

According to an announcement by J. D. Haskell, executive vice president of The Black-Clawson Co., *R. F. VOKES* has been appointed general manager of the Dilts Machine Works Division at Fulton, N.Y. Mr. Vokes will also serve as a member of the B-C executive committee.

A graduate of the New York State College of Forestry at Syracuse, where he majored in pulp and paper technology, he was at one time a technical control chemist for the Fulton Division of Armstrong Cork Co. He joined the Dilts organization in 1938 and in 1940 became director of the research and development laboratories of B-C at the Fulton Division. During that time he conducted a research program that led to the development of various items of stock preparation equipment, including the Hydrapulper. Mr. Vokes was appointed assistant general manager of the division in 1948.

L. A. Moore joins B-C

LAWRENCE A. (LARRY) MOORE, former chief engineer for American Coating Mills, a subsidiary of Robert Gair Co. Inc., has joined the engineering staff of B-C, according to an announcement by R. L. Kutter, general manager of the Hamilton, Ohio, division.

A mechanical engineering graduate of the University of Cincinnati, he joined American Coating in 1942 and in 1945 was made chief engineer. Mr. Moore will serve as assistant chief engineer for B-C's Hamilton division.

B-C International

BARRIE DIXON has joined the staff of B-C as deputy managing director of B-C International Ltd., Black-Clawson subsidiary in London. Mr. Dixon has been associated with the British and European pulp and paper industry for more than 25 years. He was at one time chief engineer for Walmsley's Ltd. Mr. Dixon will work in close conjunction with the technical departments of the B-C American divisions in the application of the firm's American-built machinery throughout the world.

JOHN C. CLAY, assistant to the executive vice president of National Starch Products Inc., has been appointed assistant administrator in charge of NPA's Chemical, Rubber, and Forest Products Bureau. He succeeds Lyall Tracy who is returning to Rayonier Inc. at Hoquiam, Wash.

J. C. Clay

T. E. Detcher

THEODORE E. DETCHER has been appointed vice president in charge of engineering for Chemical Linings Inc., Watertown, N.Y.

HAM FELTZ says:

"It's paper... but it's NOT foolscap"

It makes no difference what kind of a hat a man wears. What really counts is the knowledge and experience *under* the hat.

Some millmen could tell you that one brand of papermakers' felts lasts a long time—another removes water in a jiffy—a third felt gives a fine finish.

The important fact is that no other felts equal Hamiltons *in every respect.*

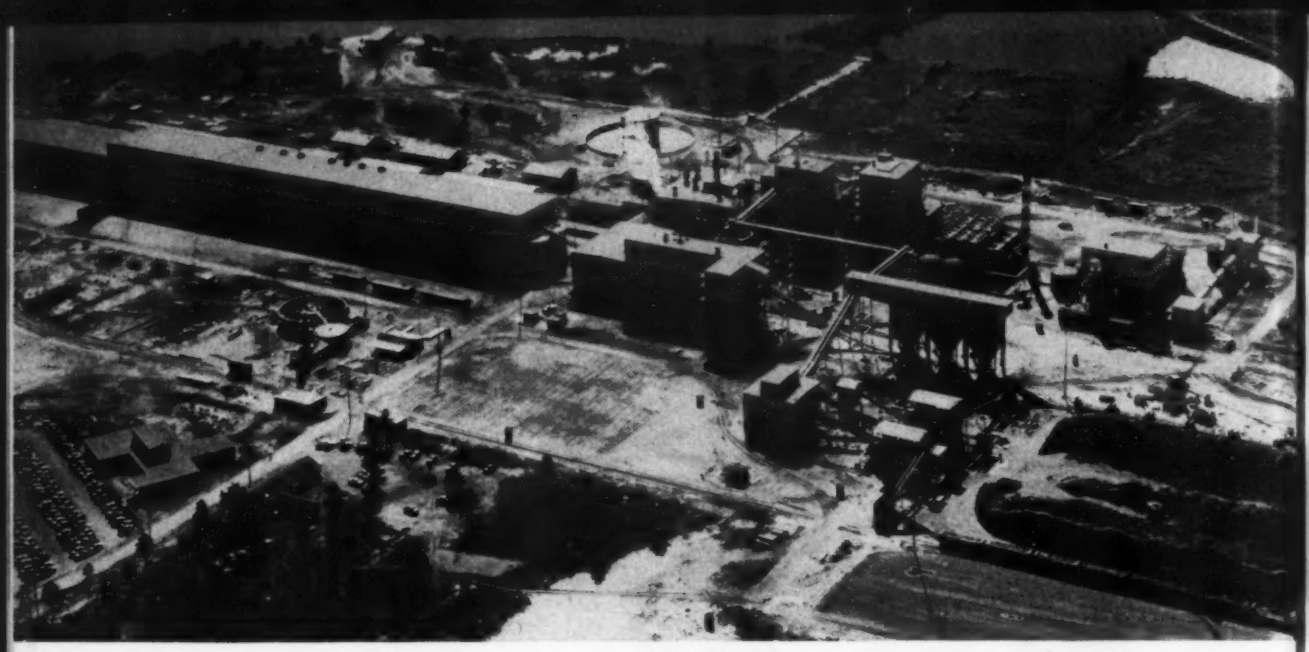
Among the 300 different styles of Hamilton Felts you will find *one* that will do your work better, faster and at lower cost.

MIAMI WOOLEN MILLS

Established 1858

Hamilton Felts

SHULER & BENNINGHOFEN, HAMILTON, OHIO



New St. Regis mill in regular production

St. Regis Paper Co.'s new mill which recently went into production at Jacksonville, Fla., adds an annual production of 100,000 pounds of paper to the company's output, bringing St. Regis' total capacity to 560,000 tons of kraft paper and board.

The completion of the new mill marks an important milestone in the company's long-range southern expansion program aimed at a complete integration of the Kraft Division and, in anticipation of which, St. Regis has acquired a permanent source of wood supply in Florida, Alabama, Georgia, and Mississippi.

The company owns, or holds under long-term management contract, over 600,000 acres of timberlands in the South. About 300,000 acres are located within a radius of 100 miles of Jacksonville. The Jacksonville mill's annual requirement of 175,000 cords of wood will be supplied from these holdings and from farmers and other landowners in this area.

Many unique features, in line with modern mill construction trends and some applied for the first time, have been incorporated in the Jacksonville mill. These include such equipment as:

1. A Beloit paper machine designed for a maximum speed of 2,500 fpm. This is an increase of 500 fpm over the speed of other paper machines of recent design. The 500 fpm increase was accomplished at an additional cost of 1 per cent of the total cost of a 2,000 fpm paper machine.

2. Stock enters the Beloit air cushioned inlet through a patented "cross flow distributor" to obtain more even distribution of fibers.

3. In the headbox stock level is maintained at a constant point by the use of either air pressure or partial vacuum, depending on the speed at which the machine is operating.

4. The 20-inch diameter lump-breaker roll has a special 2-inch thick soft Neoprene cover.

5. As part of a vacuum transfer arrangement, a suction pick-up roll is being installed in accordance with completed plans to further increase production. These plans also provide for an inverse press of latest design.

6. The Beloit heavy-duty double drum winder is of improved design for a maximum speed of 4,500 fpm.

7. Close to a million dollars has been spent for installation of the most modern equipment to eliminate odors and air and stream pollution. This includes two electrostatic precipitators supplied by Koppers Co., each designed to handle the total flue gas volume with a guaranteed removal efficiency of 95 per cent.

8. A Combustion Engineering-Superheater Inc. recovery boiler designed to burn 900,000 pounds of dry solids per hour produces 135,000 pounds of steam per hour at 625 psi and 750°F. The system includes an Elesco special design super heater, water wall furnace, Diamond soot blowers, economizer, D. J. Murray cascade evaporators, and an induced draft fan equipped with an American Blower Co. Gyrol fluid drive.

9. In addition to the recovery boiler, steam is supplied by a Combustion-Engineering-Superheater 135,000-pound-per-hour steam generating unit equipped to burn bark with oil, and a 150,000-pound-per-hour steam generating unit equipped to burn oil or natural gas. The bark burning unit is equipped with the high-set spreader stoker, embodying the principle of suspension burning, developed by Combustion Engineering.

10. Electric power is generated by two 6,000 kw 4,160 volt General Electric turbo-generators. One of these units is provided with a 9,500 sq. ft. Westinghouse surface condenser.

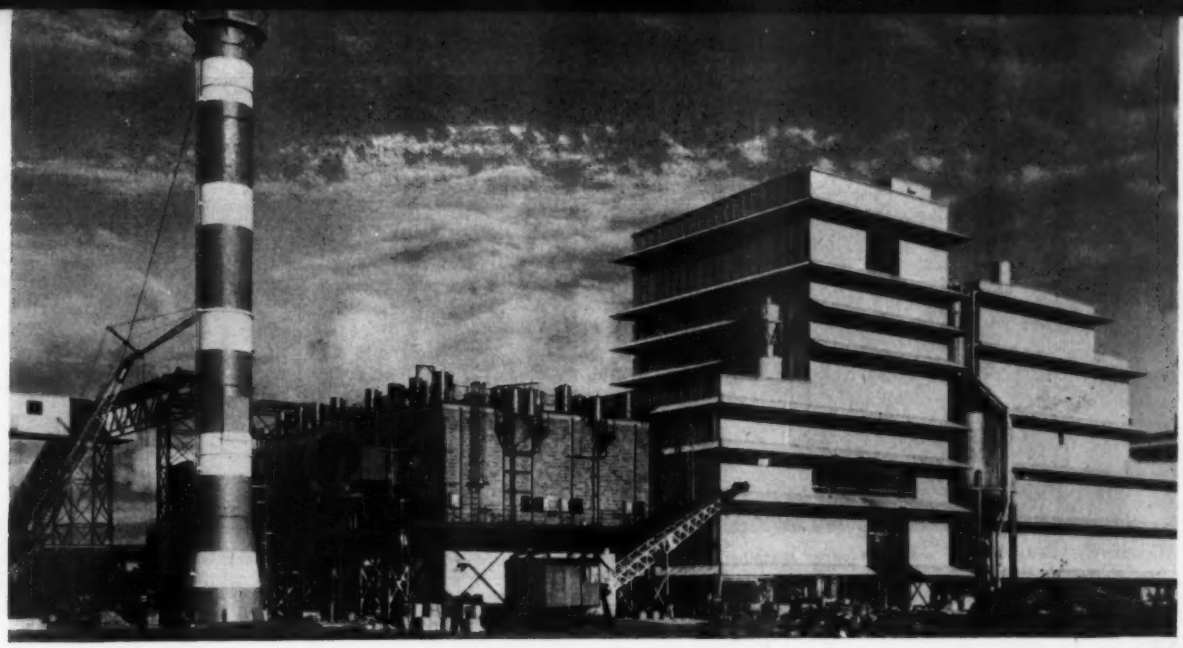
Merritt-Chapman & Scott Corp., New York, was general contractor on construction of the mill and also directed the work of all sub-contractors. Stevenson & Rubens, Seattle, carried out the engineering work on the structural and architectural design, as well as the lay-out and process arrangements for the paper mill. Merritt-Chapman & Scott provided the structural and architectural design for the pulp mill and power plant, while Johnson & Co., New York, served as consulting engineers in furnishing the design for the pulp mill and power plant and also supplied the electrical engineering drawings for the whole mill.

All phases of the project were under the executive direction of William R. Adams, St. Regis vice president and director, while all the designs and construction were supervised and coordinated by Justin H. McCarthy, chief engineer of the Pulp and Paper Division.

John K. Ferguson, who until the end of 1950 was in charge of the company's lumber mill at Fargo, Ga., is resident manager at Jacksonville. John A. McDermott, who was transferred from the company's Tacoma mill, is general superintendent. U. J. Westbrook is manager of production for the Southern Division, including pulp and paper manufacturing at both Pensacola and Jacksonville. Albert Ernest is vice president in charge of southern timberlands and procurements.

Other Jacksonville mill key personnel include Homer Lusby, paper mill superintendent; Arnold Harrison, pulp mill superintendent; M. R. Clements, power superintendent; A. B. Clark, personnel manager; H. F. Martin, office manager; F. C. Fish, purchasing agent; V. J. Galligan, traffic manager, and W. R. Roberts, technical director.

The major expansion of the company's kraft pulp, paper and board capacity at its Pensacola, Fla., Kraft Center was completed in April 1952 with the commencement of production by the No. 4 machine capable of producing approximately 100,000 tons of kraft paper and board a year and raising the capacity there to 265,000 per annum of kraft paper and board. (See September 1952 issue of THE PAPER INDUSTRY.)



Precipitator and recovery units

The following is a detailed description of the facilities and equipment which make this mill one of the most modern and efficient units in the industry.

Wood handling

Pulpwood is stored on asphaltic concrete paving in piles 35 ft. high. There are two concrete, steel lined flumes 500 ft. long and about 300 ft. apart extending into the woodyard area. This arrangement permits unloading from railroad rack type cars or trucks, either to storage or directly to the flumes by means of two P & H crawler whirley cranes, with Owens pulpwood grapples furnished by Southern Corp. Two 16,000 GPM Worthington circulating flume pumps are driven through V-belts by 100 hp motors, and are pit-located. Grit collectors and traveling water screens are provided to remove solids and bark from the flume water, which is reused. These are furnished by Link-Belt, as are all wood bark, and chip conveyors in the mill.

Two barking drums, built by Fibre Making Processes Co., are 12 ft. in diameter by 45 ft. long and are suspended by chains. Each drum is driven by a 150 hp, 720 rpm motor. The bark removed from the wood falls to drag chains which take it to a single deck Link-Belt screen and a Mitts & Merrill 100 hp bark crusher which prepare the wood refuse for firing in the spreader stoker-equipped bark burning boiler.

De-barked wood travels up inclined conveyors to two 88-in. 10-knife chippers, built by D. J. Murray Mfg. Co., each V-belt driven by a 400 hp, 720 rpm motor. Bucket elevators convey the chips to four feeder equipped Link-Belt vibrating chip screens. Oversize chips and slivers are carried to a 36-in. hammermill chip crusher, built by D. J. Murray, and are then returned to one of the elevators. Sawdust and fines drop to a 36-in. belt conveyor, which also receives crushed bark outside the wood room, for the beginning of its travel overhead to the bark boiler.

Accepted chips travel on a 36-in. belt parallel to the bark conveyor and up an incline to be distributed by a 36-in. conveyor with tripper to three 42-ft. diameter steel silos 65 ft. high.

Link-Belt chip silo discharge feeders are 17 ft. in diameter and are of the rotary plate type driven through a large ring gear and pinion, and are arranged to deliver the chips at a steady rate to a 42-in. belt. This conveyor takes chips to the digester building. Near its upper end, the conveyor passes over a Merrick Scale Mfg. Co. Weightometer and a magnetic pulley which removes any stray particles of metal.

R. K. Ferguson
President

E. R. Gay
Exec. V. Pres.

W. R. Adams
V. Pres.

J. K. Ferguson
Resident Manager

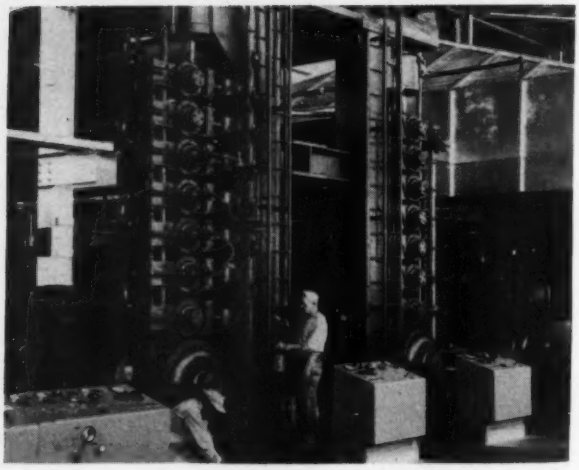
J. H. McCarthy
Chief Eng.

U. J. Westbrook
Prod. Mgr.

Albert Ernest
V. Pres., Timberlands

John A. McDermott
Genl. Supt.

Wet end of new kraft paper machine



Calender stacks

One of two Layne-Atlantic pumps installed at new St. Regis mill

Wood yard, with drum barkers and woodroom in background

Pulp mill

The digester building is 30 ft. wide by 82 ft. long and has a 36-ft. ell which houses the measuring tanks and turpentine recovery equipment. There are four digesters, 46 ft. from flange to flange and 12 ft. inside diameter, 4,000 C. F. volume, furnished by Chicago Bridge & Iron Co. Electric Steel Foundry Co. circulating systems are installed, with Bingham pumps and provision for future indirect cooking. Blow valves, by Paul Valve Corp., are operated by hydraulic equipment made by Racine Machine & Tool Co.

A 48-in. belt shuttle conveyor, furnished by Link-Belt Co., is used for filling digesters with chips through an overhead rail-mounted movable hopper. Automatic digester controls for cooking and relief are furnished by the Bristol Co.

The digester blow tank, furnished by Chicago Bridge & Iron, has an Impco agitator. Heat recovery equipment consists of a blow steam condenser, accumulator tank, circulating pumps, regulators, strainers and heat exchangers, all furnished by Foster-Wheeler Corp., who also supplied equipment for a crude turpentine recovery system.

The washer room is an extension of the digester room ell, 36 ft. wide and 95 ft. long and contains three 11½ by 16 ft. Impco brown stock washers with repulpers and a vibratory de-knotter.

Three filtrate tanks 35 ft. in diameter by 30 ft. high, and one foam tank, 24 ft. in diameter by 50 ft. high, furnished by Chicago Bridge, are located in the tank area adjacent to the washer room and alongside the blow tank and heat recovery equipment.

The washer hood and exhaust system is by Jamar-Olmen Co. of Chicago and New York, with whom Drew Engineering Co. of Portland, Ore., collaborated on general and detail design. It includes a Transite panel type hood which extends over the washers and de-knotter, and two 48-in. Sturtevant axial flow fans discharging vertically through the roof.

Brown Instrument Co. instrumentation and control is used for the brown stock washing installation.

The screen room building is 74 ft. wide by 110 ft. long and contains 22 Impco 14-plate flat screens installed in lines of two screens per line, arranged for 16 primary screens and six tailings screens, the latter being provided with scrapers. Screen rejects are discharged to a Bauer refiner or to a rejects storage chest when the Bauer is out of service. There are two vacuum deckers furnished by Impco which have cylinders 8 ft. in diameter by 12 ft. long, and peg-roll repulpers, discharging vertically into 14-in. diameter screw conveyors. These conveyors reverse so as to discharge either at high-density to a 24-in. belt conveyor furnished by Link-Belt, or directly to the decker chest, after dilution. The belt conveyor travels over an inclined bridge from the screen room to the high-density pulp storage tanks at the end of the beater room across the main plant roadway.

There is a screened stock chest 67 ft. long with seal pit and white water chamber in the basement of the screen room.

A similar chest serves for inprocess storage of washed stock ahead of the screens. These chests and pits, together with the 15-ft. diameter screen rejects chest, are constructed of Semtile furnished by Stebbins Engineering & Mfg. Co.

Chemical recovery and liquor making

The sextuple effect evaporator, furnished by Goslin-Birmingham Co., is equipped with Labour liquor pumps, Worthington condensate and liquor transfer pumps, a Goulds pump for cooling water to the evaporator condenser and a Kinney gear pump for soap handling.

The recovery boiler is designed to burn 900,000 lbs. of dry solids per hour. Furnished by Combustion Engineering-Superheater Inc., it produces 134,000 lbs. per hour of steam at 625 psi and 750° F. An Elesco special design superheater, water wall furnace, Diamond soot blowers, economizer and D. J. Murray cascade evaporators are included in the design. The induced draft fan is furnished with an American Blower Co. Gyrol fluid drive. The recovery building is 50 ft. by 63 ft. and over 100 ft. high and has an Otis seven-stop, 2500-lb. elevator.

Salt cake is unloaded from box cars, delivered to storage bins, and transported from storage to a process supply bin by means of a Fuller Co. Airveyor system. This system employs a Rootes type exhauster, a four compartment cam-operated filter, a rotary discharge lock, a motor-operated gate and a single stage cyclone receiver, 12-in. Jeffrey screw conveyors, pan feeders, and pulverizer, and Fuller high level bin indicators. Two bins 31 ft. in diameter and 65 ft. high, with conical tops and bottoms are by Chicago Bridge.

Two electrostatic precipitators are furnished by Koppers Co. for the recovery of chemicals and the abatement of odors in the spent gases from the recovery boiler. This equipment is of generous capacity in line with assurances given by the company to the people of the community at the inception of the project. Each precipitator is designed to handle the total flue gas volume, with the other one available at all times as a spare, and each unit is furnished with a complete set of auxiliary equipment. Removal efficiency of 95 per cent is guaranteed, which sets a maximum not to exceed 125 grains per cubic foot of residual dust at the precipitator under normal operating conditions. The stand-by precipitator can be kept warm at all times and ready for instant startup. Some slight odor will remain, of course, in the stack gases, but the company has gone farther than is customary in the industry in line with its well known policy of being a "good neighbor." In addition to the benefits from good public relations, there will be substantial economies in the recovery of chemicals, which will help eventually in paying off the heavy investment required by this type of equipment.

In the causticizing plant there is a Dorr Co. lime slaker; also, three causticizing reaction tanks, green liquor and white liquor clarifiers, mud washing and thickening tanks and a dregs washer. In addition, the Worthington liquor pumps, Dorrco underflow pumps, an Oliver United mud filter and lime mud filtrate pump, a Nash vacuum pump for the lime mud filtrate receiver and Ross feeders for new and reburned lime, lime handling elevators and conveyors are all furnished by Dorr. The special water-jacketed kiln feed conveyor is furnished by Link-Belt.

Fresh lime is unloaded from box cars and delivered to storage by means of a Fuller Airveyor system, which includes a Rootes type exhauster, a four-compartment cam-operated filter and a rotary discharge lock. Fresh lime and reburned lime bins 18 ft. in diameter are made by Hammond Tank Co., who served as subcontractor on these and all other tanks furnished by Dorr.

The lime kiln is 9 ft. in diameter by 175 ft. long furnished by Traylor and is served by a Coen fuel-oil firing system. To recover the dust in the gases from the kiln, a Rotoclone unit, furnished by American Air Filter Co., is erected at the discharge end.

Steam power plant

To provide for the total steam requirements of the mill, there is, in addition to the recovery boiler mentioned above, an oil-fired power boiler capable of producing 160,000 lbs. per hour at 625 psi and 750° F. The Combustion Engineering-Superheater design includes an Elesco interbank superheater, a tubular air preheater, a steam air heater, American Blower forced draft and induced draft fans and Diamond soot blowers.

There is also a Combustion Engineering-Superheater bark boiler capable of producing 135,000 lbs. per hour of steam at the above condition. The design includes an Elesco superheater, Diamond soot blowers, air preheater, continuous discharge spreader stoker with distributors, Reeves vari-speed drives for stoker and distributors, American Blower fans with Gyrol fluid drive on the induced draft, and a Western Precipitation Corp. Multiclone dust collector.

Three Ingersoll-Rand seven-stage feed water pumps serve all three boilers; two are driven by 311 hp Terry turbines and one is motor driven. There is a Worthington vertical jet deaerator and two stages of feed heating by means of tube and shell heat exchangers furnished by the Alberger Heater Division of Howard Iron Works Inc. Feed water conditioning equipment is by Graver Water Conditioning Co. and consists of hot lime process sedimentation tank, chemical feeds, pressure filters, zeolite softeners, automatic desludging controls, Ingersoll-Rand backwash, booster and chemical pumps and Milton Roy chemical feed pumps.

Hofft Co. Inc. bark storage bin and multiple screw type bark feeding machinery has four Reeves variable speed drive units.

Electric power plant

The turbine room is 50 ft. by 120 ft., adjoining the power boiler room and houses two 6000-kw, 4160 volt, ac, 0.8 P.F., General Electric turbo-generators and the electric feeder distribution switch gear. Each of these units is designed for operation with steam at the throttle of 625 lbs. gauge and a total temperature of 825° F., but will be operated at 750° FTT. One unit is provided with a 9500 sq. ft. Westinghouse surface condenser, condensate pumps, air ejectors and required auxiliary equipment and is arranged for the extraction of steam at 65 psi gauge. The other unit is arranged for extraction at 165 psi gauge and exhausts at a back pressure of 65 psi gauge. The arrangement of electric power distribution from the turbine room switchboard consists of transmission at 4160 volts through feeders to the starting controls of the 4160-volt motors (200 hp and above) and to several 1000 and 750 kva transformer power centers located in the mill, from which the 440-volt distribution feeders are run to the various motor control and lighting centers.

Two Goulds pumps furnish brackish river water to the turbine condenser. These are located in a pump house at the waters edge, together with a Rex travelling water screen furnished by Chain-Belt Co. A Wallace & Tiernan chlorinator is used to prevent the development of marine organisms in the system.

Paper mill buildings

The machine room is 83 ft. wide and 660 ft. long, with the first 140 ft. housing refining equipment located on the operating floor and the stock chests, pumps, agitator drives, etc. on the ground floor below.

Beater room

There are two, three-roll Victory beaters, each roll driven through V-belts by General Electric 300 hp synchronous motors. Four Emerson jordans are driven by General Electric 400 hp synchronous motors. Piping is arranged for any desired combination of beaters and jordans

in order to provide maximum flexibility for primary and secondary refining and finishing treatments. The control cubicles for these motors and the exciter sets are located on the mezzanine floor which is continuous with the structure of the machine room.

An 8 ft. by 16 ft. Oliver United vacuum saveall with tile vat is located on a platform extension of the mezzanine floor at the end of the stock preparation room. Stainless steel head boxes are provided for the beaters. DeZurik consistency regulators serve the beaters and jordans, respectively.

Two 30 ft. diameter storage chests for high-density stock are located outside the end of the beater room. They are constructed of Semtile by Stebbins Engineering and are furnished with Impco propeller type agitators and hydraulic mining type nozzles.

Four concrete stock chests with midfeather are equipped with horizontal propeller type agitators, furnished by Impco, and are located in the beater room basement.

Stock and water pumps are furnished by Goulds Pumps Inc., and piping for stock and white water lines is Transite with fabricated stainless steel fittings. All concrete stock chests and the various pits and chests under the paper machine are lined with Semplate tile by Stebbins Engineering.

Paper machine

The Beloit Iron Works fourdrinier has a wire 230 in. wide by 120 ft. long. A Beloit patented cross flow distributor serves a Beloit pressure vacuum head box with two rubber covered rectifier rolls and an adjustable slice with two rectifier rolls having variable speed drive.

The breast roll is 32 in. in diameter, and the forming board is stainless steel with Panelyte blades and mountings. The table rolls are of aluminum Panelyte covered, with stainless deflectors having Panelyte tips. There are 10 stainless steel suction boxes. Wet boxes have Panelyte covers with slanting drilling, and dry boxes have end grain maple covers. Wire guide and return rolls are of steel tube with heavy brass covers. Inside rolls need not be removed for the wire change, which is accomplished by conventional Beloit removable fourdrinier. The Beloit high-speed shake is a multiple unit driven by adjustable speed dc motor, each unit separately adjustable. There is a 24 in. diameter, open end, dandy roll, covered with bronze wire. The lumpbreaker roll is 20 in. in diameter with 2 in. thick special soft Neoprene cover. The air roll is of aluminum with adjustable mounting, air cylinder for raising, and air wheel drive for starting. The saveall is of stainless steel carried on the main fourdrinier beam. The felt rolls are 16¾ in. in diameter, rubber covered.

The fan pump is of 30,000 gpm capacity, furnished by Worthington and direct connected to a G.E. 350 hp, 450 rpm synchronous motor. A Beloit teardrop valve throttles the pump discharge. All stock and white water piping associated with the machine inlet is fabricated of stainless steel with horizontal runs sloped upward in the direction of flow to permit release of excess air, either to vacuum or to atmospheric vents. The fan pump suction is a short reducing elbow, 72 in. by 36 in. and 75 in. center to face.

The wire pit is arranged to give the utmost stilling effect for release of excess air. The connection on the bottom to the fan pump elbow is separated from the remainder of the pit by a longitudinal U-shaped dam. This causes the white water flowing in at the wet end to divide into two channels, thus passing first along the sides of the pit, then turning under the ends of the dam to the center, after which it flows back and down into the fan pump suction.

The press section is of Beloit vertical type, consisting of two 36 in. diameter rubber covered suction rolls equipped with saveall and air loaded packing holders and two 34 in. diameter top press rolls with 1 in. rubber covering. All top press rolls are carried on swing arms with air loading and air lifting equipment.

There are two Vickery felt conditioners, each having four Jordan reverse type heads.

For water and air removal requirements there are nine vacuum pumps made by Nash Engineering Co. and furnished by Beloit as follows:

For the couch roll—three H-12A pumps; for the two press rolls—two H-11A pumps; for the flat boxes—one K-9 pump; for the felt conditioners—one K-7 pump, and for the felt box vacuum—one K-5 pump. All of the suction pumps are individually motor driven through multiple "HY-T" synthetic fiber V-belts made by Goodyear and furnished by Transmission Equipment Co.

The dryer section of the machine consists of 71 paper dryers and 18 felt dryers, all 60 in. in diameter, arranged as follows:

First dryer section: 20 paper dryers and six felt dryers, of which two are Feeney type;

Second dryer section: 18 paper dryers and six felt dryers, of which four are Feeney type.

The breaker stack consists of one bottom roll, 33 in. diameter, covered with ½ in. Stonite; one top roll 34 in. diameter, covered with 1 in. rubber; located between the second and third dryer sections.

Third dryer section: 18 paper dryers and four felt dryers, of which two are Feeney type.

The size press consists of one bottom roll, 33 in. diameter, covered with ½ in. white Stonite; one top roll 34 in. diameter covered with 1 in. rubber; located between the third and fourth dryer sections.

Fourth dryer section: 15 paper dryers and 2 felt dryers.

All of the dryers are designed for operation at 125 lb. steam pressure. Dryer bearings are heavy duty Torrington spherical roller self-aligning type with back bearings mounted outside the drive gears and front bearings arranged for expansion. Dryer frames are box type, with back frame completely enclosing gears and bearings. Helical gears of small diameter are arranged for indrive at one point in each section. All felt dryers are driven by the felt.

The Bowser circulating oil system, furnished by Beloit, is complete with tanks, pumps, filters and regulating equipment installed on the ground floor and serves the dryer bearings, dryer drive parts, felt roll bearings and calender stack bearings.

A low pressure blower system is supplied to keep a slight pressure in the drive gear enclosure frames to minimize foam and vapor condensation. Lodding doctors with air oscillation are provided for the first bottom dryers and last top dryers in each section. The entire dryer section is equipped with automatic rope paper carriers. Also, a short rope carrier is provided at the reel.

A Midwest-Fulton dryer condensate removal system is installed. Drying is controlled by means of Taylor pressure recording controls on the first two dryer sections, and Stamm moisture controls, provided also with pressure control, for the third and fourth dryer sections.

Two Beloit open-sided calender stacks are provided with 34 in. diameter king rolls and seven 16 in. diameter intermediate and top rolls. All rolls have flexible blade doctors, air loaded. Bottom doctors are oscillating type. Each stack has motor operated roll lift and air loading.

The reel is a Beloit heavy-duty type having a 36 in. diameter drum, taking a maximum 84 in. diameter reel of paper. The unwinding stand has adjustments for aligning the reel spools across the machine and in the machine direction. Regenerative braking is employed. The winder is a Beloit extra-heavy-duty machine with two 20 in. drums with individual motor driving each drum. Designed for a maximum speed of 4500 fpm, the winder is equipped with motor driven shear type back slitters, rider roll lift and roll ejector.

The paper machine is designed, and all rolls are balanced, for a maximum

mechanical speed of 2500 fpm. Practically all rotating parts are provided with anti-friction bearings, generally of Torrington manufacture.

Pneumatic systems for the paper machine are served by Chicago Pneumatic Tool Co compressors. The essential air compressor serves the head box, slice seal, fourdrinier, presses, dryer felt auto guides, breaker stack and size press. Other services are taken from the main mill supply header.

Equipment is on order for an inverse second press, conversion of present first and second presses to suction transfer press and first suction main press, respectively, and the addition of a suction pick up roll, wire turning roll, necessary felt equipment, Vickery conditioner, vacuum pumps and machine drives.

Hoists

The machine room crane is of twin box girder bridge design with two 15-ton trolley hoists, made by Ederer Engineering Co. Reel crane is a 20-ton overhead bridge with fixed hoist made by Manning, Maxwell & Moore Inc.

Air systems

The Transite panel hood is 256 ft. long with seven exhaust outlets to 72 in. axialflow fans driven through V-belts from motors located on the machine room mezzanine floor over the drive aisle back of the machine. Also included are a calender cooling system, trim conveying system, dc motor ventilation, electric room ventilation, lower felt air systems, finishing room supply, machine and beater room, roof supply systems, including summer cooling, a Deco high-jet system, auxiliary wet end roof exhausts, a Hydrapulper exhaust system, and a winder and core saw-dust collecting system.

All heating and ventilating apparatus and distribution are made by Jamar-Olmen Co. with whom Drew Engineering Co. collaborated on general and detail design.

In addition to the paper mill systems and the brown stock hood and exhaust systems mentioned above, there are two constant temperature and humidity rooms, a precipitator control room ventilation system, and four electrical center ventilation systems.

Hydrapulper

An 18-ft. Shartle Brothers Machine Co. Hydrapulper is located to receive broke directly from the last dryer, from either calender, or from the reel. It also receives trim from the winder through pipe ducts. A stainless steel collecting hopper made by W. L. Rives Co. of Jacksonville serves the Hydrapulper. This arrangement eliminates the necessity for a broke man since everything is controlled from the backtender's station. It also permits keeping an orderly basement.

Paper machine drives

The General Electric sectional electric motor drives have Farrell-Birmingham herringbone reducers and are energized by multiple M-G sets with electronic amplidyne regulation. These include two 1500 hp 4160 volt synchronous motors driving individual generators for all sections from couch to winder, all installed in two separate enclosed electrical rooms on the ground floor of the machine room.

The paper machine drive has General Electric electronic control, with speed regulators for each section plus potentiometer maintenance of sheet tension at the dry end. Photoelectric equipment stands guard over dryer felt alignment and squirt actuation in case of breaks.

Finishing room

The finishing room is a 240 ft. extension of the machine building. Equipment includes rotary cutters with backstands and 110 in. duplex layboy furnished by Moore & White Co.; a Harris-Seybold trimmer with backgauge travel; a 15-ton hydraulic elevator furnished by Otis Elevator; a rewinder with unwind stand and an automatic roll ejector furnished by Langston; and in the basement, a Link-Belt paper roll upender. Other finishing equipment, located in the end of the paper machine room, includes a roll wrapping machine with backstand and a roll heading machine furnished by Lamb-Grays Harbor Co. of Hoquiam, Wash.; also, a Link-Belt Lowerator for lowering rolls to the first floor and a Link-Belt floor type paper roll conveyor 75 ft. long for transporting rolls sideways into alignment with finishing room equipment.

General features of construction

In general, the pulp mill buildings consist of structural steel framework on concrete foundations, with concrete floors and corrugated Transite siding on steel girts. The paper mill buildings are similar except that all framing up to the machine floor is of concrete. All windows in the paper mill, chipper and turbine rooms, are H. H. Robertson Co.'s corrugated Mississippi wire glass furnished by Pittsburgh Plate Glass Co. The pulp mill buildings and power plant have corrugated Transite open canopies without windows of any kind. All major buildings have precast concrete tile roof slabs, supported on steel purlins and covered with Barrett built-up roofing.

Office buildings have concrete columns, floors and roof slabs, and insulated walls faced with yellow brick. Large windows with intermediate panels of yellow brick give all three buildings a very pleasing, modern style. The architecture and engineering for these buildings are by Celli-Flynn, architects of McKeesport, Pa.

The administration building has an attractive entrance lobby on the southwest corner of the south wing, which also contains a general office, offices for the Woodlands Division of the company, a lunch room and other employee facilities. The north wing contains offices for the resident manager, for the engineering department and for the accounting department, with vaults, duplicating, supply and conference rooms and a general office serving the whole area.

The employee facilities building consists of three separate buildings under a common roof, with generous time aisles and covered walkways between. The personnel department is located in one unit, an excellently appointed cafeteria in another, and locker rooms for all mill employees in the third and largest, which measures 55 ft. wide by 85 ft. long. Many large panels of glass block add to the attractive appearance of the locker rooms.

The mill offices are housed in a two story building, 40 ft. wide and 80 ft. long. The general superintendent's office, and offices for the various operating supervisors, are located on the ground floor, together with a conference room of generous size and other facilities. The laboratories and chief chemist's office are on the second floor, which has ready access by bridges to the turbine room, beater room, and screen rooms.

Water supply and fire protection

Water for the new mill is taken from two Layne-Atlantic Co. 1300 ft. deep wells of 10,000 gal. combined capacity. Three smaller Layne-Atlantic wells are provided for observation and permanent record of the water table in the vicinity. The water purification system is by Infilco Inc., of Tucson, Ariz., and consists of a 12,000,000-gal. per day accelator for selective lime softening, coagulation and clarification, water control and proportioning equipment, chemical feeding equipment, a turbidity detector, a Milton Roy alum pump, a Wallace & Tiernan chlorinator, and Builders-Providence controls.

There are two Peerless fire pumps of 1500 GPM capacity at 230 ft. head furnished by Food Machinery & Chemical Corp., one of which is motor driven and the other driven by a Terry steam turbine. The fire tower is a 100,000-gal. elevated tank 175 ft. high, furnished by Chicago Bridge.

There is a complete underground fire protection system with 30 hydrant stations outside and Grinnell automatic sprinkler systems in all enclosed buildings, chip silos, bark bin and conveyors, all furnished by Moore Pipe & Sprinkler Co. of Jacksonville.

High-yield cold soda pulps and products from several woods

K. J. BROWN and J. N. McGOVERN
Chemical Engineers
U. S. Forest Products Laboratory
Madison, Wis.

Hardwood pulp yields of 88-90 percent are obtained by the cold soda process. These pulps can be bleached economically to brightness values of 65-70 percent

THE COLD SODA process was developed at the Forest Products Laboratory as a result of basic investigations of high-yield pulping processes and their application to hardwood species in particular. The results of the first investigation indicated that, by a simple process conducted at room conditions, pulps having sufficiently high strengths and other qualities to show promise for a number of applications could be produced in yields of 85 to 95 per cent. The particular suitability of the process to the hardwood species is especially important in view of the fact that the increasing demands for pulpwood cannot be met by the available softwoods.

In the cold soda process the chips are first steeped in a solution of sodium hydroxide in the absence of heat and pressure, then the softened chips are fiberized in an attrition mill. Thus, it is a type of semichemical pulping process, and equipment generally found in semichemical mills can be used for cold soda pulping.

The steeping is done at atmospheric temperature and pressure and usually lasts from 1½ to 2 hours. The strength of the treating solutions range from 20 to 100 gm. of sodium hydroxide per liter depending upon the requirements for yield and quality. This results in a corresponding chemical consumption of 5-8 per cent based on the weight of moisture-free wood. The process removes some hemicellulose, but there is very little or no loss in either lignin or alpha cellulose.

The energy needed for fiberizing the chips is within commercial practicability and usually falls within a range of 20-30 hp-days per ton of air-dry pulp.

The cold soda process was first used with aspen, and the pulp was shown to have promise for use in corrugating board.* This report describes recent tests of woods representative of the major pulping regions in the United States. Uses for the cold soda pulps other than for corrugating board have also been investigated, and these results, as well as comparisons of corrugating boards made from several species, are discussed.

Experiments with several woods

Seven hardwoods and two softwoods were evaluated for cold soda pulping in the experiments. The concentration of the sodium hydroxide solution was the only treating variable, except for a few experiments with white oak, jack pine, and western hemlock in which time was also varied (Table I). In practice, concentration is the only condition which can be varied practically, because the temperature and pressure are fixed at room conditions by the concept of the process, the chip size is necessarily held within the limits of practical production (the shortest possible chip is desirable), and the time of the treatment is relatively ineffective after 1.5-2 hours.*

Hardwood pulping

The seven hardwoods tested varied slightly in their consumption of alkali and considerably in their pulp yields (Table I). For example, at the constant treating concentration of 50 gm. per liter used in tests on six of the woods (birch excepted), the consumptions were nearly the same for all woods except red oak, which was higher. The pulp yields, however, ranged from 87-92 per cent, white oak ranking highest. The high yield obtained for the white oak indicates this wood is the least reactive toward the treatment. In fact, the basic differences

*K. J. Brown and J. N. McGovern. TAPPI 33:364-368, August 1950

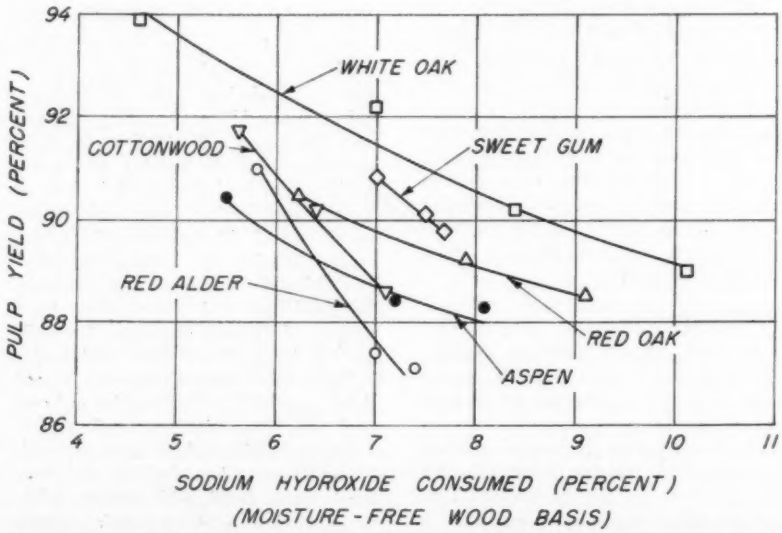


Figure 1—Relations between pulp yield and sodium hydroxide consumed in cold soda pulping of various hardwoods (constant treating time of 2 hours and temperature of 25° C.)

Presented at a joint meeting of the Pacific Section of Tappi, the Pacific Coast Division of the Superintendents Association and the Western Group of the CPPA Technical Section, September 25-27, 1952, at Victoria, B.C.

Acknowledgment is made to Great Lakes Paper Co., Fort William, Ont.; Simpson Logging Co., Shelton, Wash.; Longview Fibre Co., Longview, Wash.; Albermarle Paper Mfg. Co., Richmond Va.; Fleming & Sons, Dallas, Texas, and Central Fibre Products Co., Quincy, Ill., for their cooperation in part of this work.

between the various woods show up best in the relations between pulp yield and chemical consumed (Table I and Fig. 1). (The amount of chemical consumed, in turn, depends upon the concentration of the treating alkali solution.) A considerable difference between woods was found by this method of comparison. This difference can be made specific by making the comparison at the same yield, say 90 per cent. The amount of chemical consumed to attain this yield ranged from 5.7 per cent for aspen to 8.7 per cent for the white oak on a wood basis. This variation may be due to wide structural and chemical differences between these two woods.

As expected, all of the woods consumed more chemical and produced less pulp as the concentration of the sodium hydroxide solution was increased (Table I and Fig. 1). Because the woods reacted differently toward the cold soda process, it was necessary to use different concentrations of sodium hydroxide to produce yields in the range of 88-90 per cent. As discussed later, such yields were necessary to make pulps of sufficient strength for paper products. The concentrations needed to meet this specification were: cottonwood—40 gm. of sodium hydroxide per liter; aspen, red alder, and paper birch—50 gm. per liter; sweetgum and red oak—75 gm. per liter, and white oak—100 gm. per liter.

A mixture of southern hardwoods, composed chiefly of red oak and sweetgum, was pulped satisfactorily using concentrations of 75 gm. per liter, indicating that with this process no attempt need be made to segregate species with the same treating solution requirements.

The energy needed to fiberize the soda-softened chips was approximately the same for aspen, sweetgum, and red and white oak and amounted to 20 hp-days per ton of air-dry pulp to produce pulps with a freeness of 500 milliliters (Canadian Standard). Red alder, on the other hand, consumed 35 hp-days in making a pulp with the same freeness. Red alder semichemically cooked chips have also been found to have a higher energy requirement for fiberizing than other hardwoods.

Hardwood pulp strengths

The pulps increased in strength and sheet density with decreasing yield when compared at the same pulp freeness within the limits of the experiments (Table II). The increases in strength for a unit decrease in yield were of the same order for the four woods so tested —aspen, red alder, unpeeled cottonwood, and white oak. The increase in bursting strength amounted to about 0.04 point per pound and in tearing resistance to about 0.14 gm. per pound for a decrease in yield of 2 percentage points.

Aspen, peeled cottonwood, and paper birch produced the strongest pulps; they were roughly 100 per cent higher in bursting strength and 70 per cent higher in tearing resistance than the pulps from the red alder, red and white oak, unpeeled cottonwood, and sweetgum. The alder pulps, however, were tested under conditions giving low results (Footnote 2, Table II), and later tests (Table III) indicated that this wood falls only slightly below the aspen and other strong pulps. The relations of strength to yield indicated that the pulps should be made in a yield of 88-90 per cent to have possibilities for paper or board products.

Processing the treated chips to a lower freeness in the fiberizing operation (by a closer plate setting in the refiner) increased the bursting strength and sheet density of the pulp without causing any appreciable change in tearing resistance (Table III).

Hardwood pulp screen classification

The distribution of fiber sizes in cold soda pulps, as determined by screen fractionation tests using an Appleton Classifier, varied with pulp freeness (Table III). Lowering the freeness of aspen cold soda pulp from 430 to 165 milliliters decreased the coarse fraction (retained on the 24-mesh screen) from 18.6 to 4.7 per cent and increased the amount of fines (passing the 150-mesh screen) from 18.4 to 29.6 per cent without changing to any extent the intermediate fractions. The same decrease in freeness resulted in lowering the fiber-length index from 0.174 to 0.128. The same trend of results was obtained from screen analysis tests made on red alder cold soda pulps (Table III).

When the aspen cold soda pulp was compared with a commercial softwood groundwood pulp at the same freeness (Table III), the cold soda pulp was found to have less coarse material, higher intermediate fractions, and less fines. The cold soda pulp, made from a short-fibered wood, had a higher fiber-length index than the groundwood pulp made from a long-fibered wood, thereby showing that the cold soda treatment has done much to preserve the fiber length during the mechanical disintegration.

The red alder pulp showed the same trends with decrease in freeness as described above for aspen pulp (Table III). However, the alder and aspen pulps differed markedly in the distribution of the intermediate-size fractions. The alder had a preponderance of fibers retained on the 80-mesh screen, whereas the aspen

Table I.—Conditions and results of cold soda pulping of various woods

Treatment No.	Treating conditions (1)			Sodium hydroxide consumed (wood basis)(2)	Pulp yield	Sodium hydroxide consumed (pulp basis)
	Sodium hydroxide		Time			
	Concentration	Amount (2)				
	Gm. per l.	Per cent	Hr.	Per cent	Per cent	Per cent
Aspen						
735	24	11.5	2	5.5	90.4	6.1
(3)	50	23.8	2	6.7	89.0	7.5
806	63	30.0	2	7.2	88.4	8.2
Red Alder						
2681, 2682	25	12.2	2	5.8	91.0	6.4
2679, 2680	50	23.8	2	7.0	87.4	8.0
2677, 2678	75	34.9	2	7.4	87.1	8.5
Cottonwood (Unpeeled)(4)						
2378, 2379	25	12.2	2	5.6	91.7	6.1
2380, 2381	37.5	18.1	2	6.4	90.2	7.1
2376, 2377	50	23.8	2	7.1	88.6	8.0
Cottonwood (Peeled)						
2387, 2437	40	19.2	2	5.6	91.9	6.1
Sweetgum						
2394, 2395	50	23.8	2	7.0	90.8	7.7
2396, 2397	75	34.9	2	7.5	90.1	8.3
2404, 2406	100	45.8	2	7.7	89.8	8.6
Red Oak						
2392	25	12.2	2	6.2	90.4	6.9
2390, 2391	50	23.8	2	7.9	89.2	8.9
2388, 2389	75	34.9	2	9.1	88.5	10.3
White Oak						
2322	25	12.2	2	4.6	93.9	4.9
2325, 2326	50	23.8	2	7.0	92.2	7.6
2323	65	30.5	3	9.4	92.6	10.1
2327, 2333	75	34.9	2	8.4	90.2	9.3
2340, 2341	100	45.8	2	10.1	89.0	11.3
2324	100	45.8	5	11.3	88.5	12.8
Mixed Southern Hardwoods						
2399, 2400	50	23.8	2	8.1	89.1	8.8
2402, 2403	75	34.9	2	8.7	88.8	9.8
Paper Birch						
919, 921	25	12.2	2	6.7	91.9	7.3
Jack Pine						
2408	50	23.8	2	4.4	.....	.....
2409	100	45.8	2	5.7	.....	.....
4031	100	45.8	3	6.8	94.9	7.2
2415	200	120.0	4	9.9	92.5	10.7
Western Hemlock						
2732	100	45.8	3	8.3	97.6	8.5

(1) All treatments made at atmospheric temperature and pressure. (2) Based on the original weight of moisture-free wood. (3) Values by interpolation. (4) 26.8 per cent bark by weight.

Table II.—Strength properties (1) of cold soda pulps from various woods

Treatment No.	Pulp yield	Bursting strength	Tearing resistance	Sheet density
	Per cent	Pts. per lb.	Gm. per lb.	Gm. per cc.
Aspen				
735	90.4	0.40	0.85	0.50
806	88.4	.45	.98	.50
Red Alder(2)				
2681, 2682	91.0	.14	.50	.39
2679, 2680	87.4	.20	.87	.48
2677, 2678	87.1	.31	.58	.58
Cottonwood (Unpeeled)				
2378, 2379	91.7	.17	.41	.43
2380, 2381	90.2	.21	.50	.44
2376, 2377	88.6	.27	.65	.47
Cottonwood (Peeled)				
2387, 2437	91.9	.32	.70	.55
Sweetgum				
4021(3)	90.0	.25	.72	.50
Red Oak				
2388, 2389	88.5	.19	.52	.40
White Oak				
2322	93.9	.10	.30	.35
2323	92.6	.22	.52	.47
2324	88.5	.27	.65	.50
Mixed Southern Hardwoods				
4022(4)	.....	0.30	0.72	0.49
Paper Birch				
919, 921	91.9	.40	1.06	.48
Jack Pine				
4031(5)	94.9	.15	.60	.35

(1) Pulps tested at a freeness of 400 milliliters (Canadian Standard) using test sheets of 115 pounds per ream of 500 sheets, 25 by 40 inches. The treated chips were fiberized in an 8-inch disk mill and the pulps processed in a 1.5-pound test beater. (2) Test sheets of 55 pounds per ream used. (Lower test results were obtained from lighter than from heavier test sheets.) (3) Same treating conditions as treatment Nos. 2396 and 2397, table 1; the treated chips were fiberized in a 36-inch disk mill. (4) Same treating conditions as treatment Nos. 2402 and 2403, table 1; the treated chips were fiberized in a 36-inch disk mill. (5) Extrapolated values.

had fairly even distribution of fibers retained on the 42- and 80-mesh screens. As a result, the alder fiber index was appreciably lower than the aspen index. In spite of these differences, the alder and aspen pulps were approximately the same in strength when compared at the same pulp freeness and test-sheet density.

The fact that the cold soda pulps were stronger than the groundwood pulp indicates that the caustic treatment had to some extent promoted a chemical bonding between fibers.

Effect of cottonwood bark

The presence of about 27 per cent bark in the bark-wood mixture of cottonwood resulted in a decrease in pulp yield, an increase in chemical consumption, and a decrease in pulp strength (Tables I and II).

Softwood pulping and pulp strengths

The two softwoods tested, jack pine and western hemlock, were not pulped satisfactorily by the standard cold soda process. At the low temperatures used in this process these softwoods resisted the action of sodium hydroxide and apparently did not undergo the swelling action that is essential to the process. Even high concentrations of caustic and longer treating times did not soften the chips to a satisfactory degree. The high yields obtained from the softwoods are evidence of limited chemical activity (Table I). A considerable portion of the chemical consumed merely saponified extractives.

The energy required to fiberize the treated softwood chips was extremely high. Jack pine cold soda pulp produced at a low freeness had practically the same screen analysis as spruce groundwood pulp but, on the basis of pulp tests, was lower in quality than the groundwood.

Products from cold soda pulps

Printing paper: Aspen cold soda pulp was bleached and tested for use in a newsweight paper as an example of a printing paper. In the bleaching tests, calcium hypochlorite was found to be more effective than sodium peroxide, sulfur dioxide water, sodium hydrosulfite, or zinc hydrosulfite as a brightening agent. From the original brightness of 49 per cent, the aspen pulp was raised to a brightness of 69-70 per cent with calcium hypochlorite in the amount equivalent to 10 per cent chlorine based on the moisture-free weight of the pulp. The loss of pulp on bleaching was only about 1 or 2 per cent, and there was very little loss in strength.

Papers comparing favorably with experimental newsprint standards and approaching commercial newsprint paper in quality were made with 20 per cent of bleached aspen cold soda pulp as part-substitute for spruce sulfite and groundwood pulps (Table V, machine runs Nos. 3503 and 3509). The results indicated that possibly more than 20 per cent of aspen cold soda pulp could have been used satisfactorily. Printing trials will be necessary, of course, to establish the full possibilities of these papers.

In a series of runs with the bleached aspen cold soda pulp in various combinations with groundwood pulp, an increase in the percentage of aspen brought about an increase in density, bursting and tensile strengths, tearing resistance, porosity, and brightness, and a decrease in opacity (Table V). The hardness and rattle of the paper also increased as the amount of the aspen pulp was increased.

The strength and other properties of the red alder pulps indicated that they, too, might be suitable for use in printing papers.

Corrugating board: Cold soda pulps from six of the hardwoods and from the southern hardwood mixture were made into corrugating boards on the Laboratory's experimental 12-inch fourdrinier paper machine. The six hardwood species were aspen, red alder, cottonwood, sweetgum, and red and white oak. All of the pulps ran well, with good drainage and good formation. These experimental boards were made from 100 per cent cold soda pulps. In commercial practice long-fiber pulp obtained from sources such as kraft screenings or corrugated waste would probably be used to improve the paper and papermaking properties.

Using flat-crush resistance as the main measure of quality, the experimental boards made from pulps from alder, sweetgum, and the hardwood mixture compared very favorably with high-quality commercial boards (Table IV). If a flat-crush value of 40 psi is taken as acceptable for a good-quality 26-pound board, then the value of 28.4 psi obtained for the red oak is not satisfactory. However, since the freeness of this pulp was slightly high, processing this pulp to a lower freeness would have produced a board with a higher flat-crush resistance, possibly high enough to meet the standard. The other experimental boards—those made from aspen, cottonwood, and white oak—were acceptable according to the standard with respect to flat-crush resistance at a selected freeness. Comparing other strength properties, the cold soda boards were somewhat weaker in bursting, tearing, and tensile strengths and much lower in folding endurance than the commercial board.

The strength properties of red alder and white oak cold soda boards were increased by decreasing the freeness

Table III.—Screen classification and strength properties of cold soda pulps

Treatment No.	Freeness (Canadian) Standard	Screen analysis(1)					Fiber-length index	Test sheet properties(1)		
		Fraction						Bursting strength	Tearing resistance	Density
		On 24-mesh	On 42-mesh	On 80-mesh	On 150-mesh	Passing 150-mesh				
	Ml.	Per-cent	Per-cent	Per-cent	Per-cent	Per-cent		Pts. per lb.(2)	Gm. per lb.(2)	Gm. per cc.
Aspen Cold Soda Pulps										
4026	165	4.7	38.4	19.3	8.0	29.6	0.128	0.65	1.05	0.67
4026	285	6.0	37.8	18.9	9.2	28.1	.132	.49	.97	.60
4026	430	18.6	35.5	19.6	7.9	18.4	.174	.38	1.12	.53
Red Alder Cold Soda Pulps										
2710(3)	285	2.0	2.5	58.8	6.0	30.7	.116	.51	1.15	.58
2710(3)	430	4.2	4.8	54.3	5.9	30.8	.117	.42	.94	.49
2710(3)	655	20.5	7.6	50.7	4.4	16.8	.170	.30	1.07	.47
Commercial Spruce Groundwood Pulp (Shipment No. 3887)										
.....	165	15.4	18.2	16.4	15.2	34.8	.112	.25	.63	.43

(1) Test made on lapped pulp. (2) Ream of 500 sheets, 25 x 40 inches. (3) Same treating conditions as 2679 and 2680.

Table IV—Properties of corrugating boards from several hardwood pulps

Item	Cold soda pulps												Commercial hardwood semi-chemical pulp
	Red alder			Sweetgum	Cottonwood		Aspen	White oak			Red oak	Southern hardwood mixture	
					Unpeeled	Peeled							
Machine run number	3347	3349	3343	3436	3438	3442	3177	3397	3398	3399	3434	3435	(1)
Headbox freeness (Canadian Standard) ml.	340	475	595	330	355	415	360	325	380	580	440	360	.....
Weight (1,000 sq. ft.) lb.	27.0	25.3	26.1	26.6	27.2	25.9	25.4	26.8	26.4	27.0	26.4	26.6	24.3
Thickness mils	9.0	9.5	10.9	9.0	9.5	8.2	8.3	9.8	10.0	11.5	9.5	9.6	8.2
Density gm. per cc.	0.59	0.51	0.46	0.57	0.55	0.61	0.59	0.53	0.51	0.45	0.53	0.54	0.56
Bursting strength													
Mullen pts.	49.8	36.5	26.7	28.5	24.0	35.7	45.0	29.9	24.5	13.1	22.8	28.1	48.2
Unit pts. per lb. per rm.(2)	0.53	0.41	0.29	0.31	0.25	0.39	0.51	0.32	0.27	0.14	0.25	0.30	0.58
Tearing resistance gm. per lb. per rm.(2)	.64	.73	.71	.74	.56	.84	.97	.65	.60	.46	.70	.59	1.22
Folding endurance folds	16	6	3	2	.....	6	.....	4	3	0	2	.....	83
Tensile strength lb. per inch width	39.0	30.0	24.8	25.9	21.9	29.4	40.0	24.4	20.2	6.6	18.8	25.5	38.5
Ring compression (average) lb.	63.0	46.8	38.7	55.3	46.8	52.1	50.9	.....	.....	.....	41.5	54.3	53.0
Flat-crush resistance(3) lb. per sq. in.	56.1	35.4	25.5	51.5	41.8	43.8	.....	44.6	37.6	21.0	28.4	50.3	51.2

(1) Commercial hardwood semi-chemical corrugating board, Shipment No. 3152. (2) Ream of 500 sheets, 25 x 40 inches. (3) Single-face, "B" flute, corrugated fiberboard.

Table V—Properties of some experimental papers

Machine run No.	Pulp composition					Headbox freeness (Canadian Standard)	Sheet weight	Thickness	Density	Bursting strength	Tearing resistance	Folding endurance	Tensile strength	Penetration	Porosity	Opacity	Brightness	Water-absorption
	Commercial spruce groundwood (Shipment No. 3097)	Commercial spruce sulfite (Shipment No. 3098)	Bleached aspen cold soda (Treatment No. 4035(1) Bleach No. 2250)	Commercial southern pine sulfate (Shipment No. 3191)(2)	Bleached red oak cold soda (Treatment No. 4048(3) Bleach No. 2311)													
	Per cent	Per cent	Per cent	Per cent	Per cent	Ml.	Lb. per rm.(4)	Mils	Gm. per cc.	Pts. per lb. per rm.(4)	Gm. per lb. per rm.(4)	Double folds	Lb. per in. width	Sec.	Sec.	Per cent	G. E. equiv.	Sec.
Experimental Newsprint Standard																		
3503	80	20	...	...	.....	150	29.2	2.9	0.67	0.17	0.58	3	6.7	51	28.0	88.0	59.8	.....
Experimental Newsprint Papers Containing Bleached Aspen Cold Soda Pulp																		
3505	75	.....	25	.....	.....	125	28.4	2.6	.73	.16	.53	1	6.6	62.3	40.0	86.0	61.1	.....
3507	50	.....	50	.....	.....	115	30.5	2.8	.73	.19	.54	3	7.27	57.0	55.0	88.2	61.1	.....
3506	25	.....	75	.....	.....	225	28.9	2.5	.77	.20	.61	5	7.20	47.6	32.9	79.7	62.7	.....
3504	.....	.....	100	.....	.....	190	30.6	2.3	.89	.28	.64	11	10.4	57.9	58.1	76.4	69.6	.....
3509	70	10	20	.....	.....	100	30.0	2.6	.77	.18	.59	3	6.53	53.3	45.1	89.3	62.3	.....
Experimental Lightweight Corrugating Paper Containing Bleached Red Oak Cold Soda Pulp																		
3603	.....	.....	.....	25	75	325	46.3	4.3	.60	.23	1.10	.....	9.5	.....	.....	.....	55.6	.....
Experimental Creped Toweling Paper Containing Commercial Sulfite Pulps (5)																		
2804	.....	.....	.....	.....	.....	.....	36.5	6.5	.31	.13	1.05	.....	2.7	.....	.....	.....	55.9	47
Experimental Creped Toweling Paper Containing Bleached Red Oak Cold Soda Pulp																		
3605	.....	.....	.....	50	50	590	27.9	4.9	.31	.36	1.54	.....	4.3	.....	.....	.....	.....	36

(1) Treating conditions were: 2 hours at 28° C.; NaOH concentration was 45 grams per liter. (2) Bleached in a beater with 10 per cent available chlorine as calcium hypochlorite. (3) Treating conditions were: 2 hours at 28° C.; NaOH concentration was 75 grams per liter. (4) Ream of 500 sheets, 25 x 40 inches. (5) 70 per cent unbleached spruce sulfite and 30 per cent bleached aspen sulfite.

(Table IV). Each series of boards was made from pulps prepared from the same batch of treated chips. This showed that the quality of cold soda pulps can be controlled during the fiberizing operation.

The cottonwood board made from unpeeled wood was about 15 per cent lower in flat-crush resistance than the board made from peeled wood.

Lightweight corrugating and toweling papers: Red oak cold soda pulp was given a single-stage bleach with calicum hypochlorite, using 10 per cent available chlorine based on the moisture-free weight of the pulp. The brightness of the pulp was increased from an unbleached value of 38.7 per cent to a bleached value of 65.8 per cent.

A lightweight, light-colored corrugating medium was made in an experimental paper machine run from 75 per cent of bleached red oak cold soda pulp and 25 per cent of semibleached southern pine sulfate pulp (Table V, No. 3603). The paper produced was judged to be satisfactory for the corrugating medium in single-face cushioning cartons on the basis of comparison with a market product.

Creped toweling paper was made from equal amounts of red oak cold soda pulp and sulfate pulp. The properties of this paper compared very favorably with those of creped toweling made from commercial sulfite pulps (Table V, Nos. 2804 and 3605).

Conclusions

It is concluded from this work that:

1. Hardwoods now used as pulpwood can be pulped by the new cold soda process, as shown by successful pulping of the following representative woods: aspen, birch, red alder, sweetgum, cottonwood, red and white oak, and a mixture of sweetgum and oaks.

2. Bleached cold soda pulps from aspen, and probably other woods, are suitable for use in appreciable quantities in printing paper of the groundwood type as far as paper tests are concerned, although printing tests are needed for complete proof.

3. Bleached cold soda pulps from red oak, and probably other woods, are suitable for use in toweling paper in mixture with softwood sulfate pulp.

4. Corrugating boards having a very high flat-crush resistance can be made from aspen, red alder, and sweetgum, and boards generally acceptable in this respect can be made from the other woods tested.

5. Hardwood cold soda pulps can be brightened with economical amounts of bleaching chemicals to brightness values of 65-70 per cent.

6. The hardwoods vary in the concentration of treating solution required to produce yields in a range of 88-90 per cent, which is the optimum with regard to pulp strength.

7. Aspen, cottonwood, birch, and red alder cold soda pulps are stronger than those from sweetgum and the oaks at the same pulp yield.

8. Within the limits of the process, the strength of cold soda pulps increases as the yield decreases. The strength also increases as the pulp is processed to a lower freeness.

9. Bark has an adverse effect on cold soda pulping and on pulp and board quality.

10. Softwoods, as typified by western hemlock and jack pine, do not respond satisfactorily to the standard cold soda process as applied to hardwoods.

Progress in stream improvement

WILLIS M. VAN HORN
The Institute of Paper Chemistry
Appleton, Wis.

Part 2—Problems resulting from sulfate semichemical and straw pulping and deinking

In Part 1 of this series, which appeared in the March issue of *The Paper Industry*, the author dealt with the problem of sulfite liquor wastes. In Part 2 he discusses the problem of kraft pulping wastes, semichemical spent liquor, deinking wastes, and straw pulping wastes. Part 3 will focus attention on paper mill wastes and methods for the measurement of stream quality.

BECAUSE OF THE FUNDAMENTAL NATURE of the kraft process, where the spent cooking liquor is recovered, its chemicals reused, and its organic content burned in recovery furnaces, the pollutional effect of this process is not as great as in the sulfite process. For example, the B.O.D. loading per ton of bleached sulfite pulp produced may be as high as 400 pounds. On the other hand, the manufacture of bleached kraft usually results in B.O.D. loadings of 50-100 pounds per ton. When a medium-sized mill is located on a large stream, waste disposal by dilution is usually satisfactory. On smaller streams, however, kraft mill waste may cause trouble.

An examination of a typical kraft pulp mill waste indicates that it contains several components which may be troublesome from the point of stream sanitation.

One source of possible trouble may be from the relief and evaporator condensates. These waters contain relatively high amounts of materials such as sulfides and mercaptans which, although not having an appreciable B.O.D., may be toxic to aquatic forms if present in sufficient amounts. Another source of possible trouble is in the dilute wash water that, because of its low chemical content, is sent to the sewer instead of the recovery system.

The potentially toxic aspects of kraft pulp mill wastes has been discussed by Ebeling (49), Cole (50), Hagman (51), Bergström and Vallin (52), Bergström (53), and Extrom and Farner (54).

In their work for the National Council for Stream Improvement, Van Horn, Anderson, and Katz (55) established the minimum lethal concentration of the sulfides, mercaptans, sulfate soap, resin acid, and sodium hydroxide to more sensitive species of warm water fish and fish food organisms. They also devised methods for measuring these compounds in mill effluents and made extensive analyses of the waste waters of five typical northern kraft mills. Using the dilution ratio of waste volume to stream discharge volume, it was possible to calculate the river concentration of the various components after dilution and thus determine if the potentially toxic compounds existed in hazardous amounts in the river.

It is possible to remove these potentially toxic materials from the digester relief and evaporator condensates if the situation requires it. Bergström and Trobeck (56) have described a method of countercurrent scrubbing by stack gases in a wooden stave tower. They state that the amount of sulfides in the condensates are greatly reduced. Allen (57) described the installation of such a tower at the Weyerhaeuser Timber Co. mill at Springfield, Ore.

Notwithstanding the fact that good operation of a kraft mill will result in sending most of the black liquor to the recovery, some of it escapes to the stream and may cause oxygen depletion therein. As indicated above, the B.O.D. loading from a kraft pulp mill varies from 50 to 100 pounds per ton depending on the degree of bleaching.

The National Council has maintained an active and vigorous program over the past years which is designed to resolve the problem of the effect of these wastes on the oxygen balance in the stream. Gehm (58) has stated that their program on this problem has followed two lines of approach: (I) biological treatments at higher efficiencies which require more compact systems than those presently employed and (II) chemical-treatment systems, which allow integration with pulp mill recovery systems. Phase I has been reported by Moggio (59), Barnes, Moggio, and Colmer (60), and Moggio and Gehm (61). These reports indicate that fortifying the mill waste with nitrogen and phosphate salts and seeding with organisms from the mill wastes diminished the amount of aeration necessary and hastened the rate at which B.O.D. removals were obtained. For short periods of aeration (8 hours or less), the rate of B.O.D. removal was only slightly less than with longer periods (24 hours). The commercial feasibility of this process will be determined after an adequate pilot plant study.

The chemical-treatment approach (Phase II above) has been reported by Moggio (62). He stated that the greatest disadvantage of all processes examined was the excessive cost of treatment, coupled with the problem of handling and disposing of the large quantities of sludge produced. One possible exception to these objections may be found in a treatment involving excess lime and carbonation, followed by the recovery of the lime in the precipitated sludge. The article stated further that the development of an easily dewatered sludge and control methods is essential to the success of any chemical-treatment method.

In recent years much attention has been paid the use of oxidation and/or impounding lagoons for the disposal of kraft waste liquors.

Crawford (63) has described his experiences at Camp Mfg. Co. in Franklin, Va. The strongest wastes were impounded during periods of low water flow for discharge when the river was higher. During the time that these wastes were in the pond there was an appreciable drop in their B.O.D.

Porter and Bishop (64) have reported on the work done at Southland Paper Mills Inc., at Lufkin, Texas. The total mill effluent at this mill is a combination of wastes from a kraft pulp mill, bleach plant, groundwood pulp mill, newsprint machine, and cylinder board machine. Treatment consists of a settling basin to remove suspended solids and two large oxidation ponds. The over-all reductions in B.O.D. is in excess of 70 per cent.

The problem of semichemical spent liquors

The third major stream improvement problem facing the pulp and paper industry—one which is becoming more and more important—is that of the dis-

posal or utilization of spent semichemical liquors. Of these, the liquors resulting from the neutral sulfite process are of great interest because of the widespread use of that process.

The problem of spent neutral sulfite liquor is mainly one of its B.O.D. This may range from 150 to 250 pounds per ton of product.

Sapp (65) stated that, where neutral sulfite mills are operated in close conjunction with kraft mills, it is possible to pass some of the neutral sulfite liquor to the black liquor recovery system. This has its limitations, however, since the ratio of neutral sulfite liquor to kraft liquor may not exceed, it is understood, the 1:4 value.

The National Council (66) is conducting a research program for finding ways of disposing of neutral sulfite liquor. This program has been directed toward finding a more economical way of evaporating the liquor.

There is some interest in the industry in segregating and lagooning the stronger wastes from the neutral sulfite operation. Where this has been done there is an improvement in the oxygen balance of the receiving water. One possible drawback of this method of disposal is the fact that the wastes may develop an unpleasant odor during the period of their impoundment.

The problem of deinking wastes

The objectionable properties of deinking wastes from the standpoint of stream economy are: (1) quantities of suspended solids which cause high turbidity in the receiving water and which might cause sludge deposits under certain conditions; (2) the B.O.D. of the wastes and (3) the muddy gray to almost black color which may adversely affect the aesthetic qualities of the receiving water (67).

Morgan (68), working with the National Council, devised a laboratory-scale treatment for deinking wastes involving biological treatment. From this work a pilot plant was developed at the Plainwell mill of Michigan Paper Co. (69-71).

A commercial scale plant was later built by Kalamazoo River Improvement Co. at Plainwell (72). Its design and operation have been discussed in detail by Palladino (73-75).

A primary treatment deinking waste plant at Falulah Paper Co. is described by Palladino and Baigas (76).

It is anticipated that the Plainwell plant will remove in the neighborhood of 70 per cent of the B.O.D. (75). One problem that derives from its operation is that of sludge disposal and this problem has been discussed by Palladino and Baigas (76) and by Kalamazoo River Improvement Co. (77).

There is little doubt that this work provides a significant approach to one of the more troublesome of pulping pollution problems.

The problem of straw pulping wastes

Working under the sponsorship of the National Council, Bloodgood and Erganian (78) have described the pollutional properties of straw pulping wastes and found that, on a laboratory scale, there was 80 per cent reduction of B.O.D. when samples were incubated at 37° C. for 14 days.

Bloodgood and Hargleroad (79) investigated the feasibility of biological treatment of strawboard wastes by using a pilot-scale trickling filter at Terre Haute Paper Co. and concluded that this method was unsatisfactory.

Bloodgood (80) then described a pilot plant designed to treat these wastes by a process anaerobic digestion. This plant had a primary sedimentation tank, sludge digestion tank, secondary settling tank, waste sludge storage tank, and pumping equipment for returning the sludge from the secondary tank to the digestion tank. He found that primary treatment would remove 19 per cent of total solids and 30 per cent of the B.O.D. and that the over-all process would result in an effluent having 150 ppm or less of B.O.D.

Chene, *et al.* (81) have described their method of treating straw cook liquors by chemical means. The B.O.D. of lime straw cooking liquor was considerably reduced by treating with an excess of carbon dioxide and neutralizing with lime to a pH of 7.5.

In recent years there has been some renewed interest in treatment of strawboard mill wastes by ponding. Such oxidation ponds are discussed in general and in principle by the American Public Health Association (82). Krancher (83) has described his experiences with the lagooning system of Ball Brothers Co. at Noblesville, Ind. He found that there was substantial reduction in B.O.D. and suspended solids, and that the lagoons also afford storage capacity which permits a controlled discharge in a manner to minimize the effect of the waste on the receiving water.

Literature cited

49. Ebeling, F., *Vom Wasser* 5:192-200 (1931).

50. Cole, Arch E., *Sewage Works J.* 7:280-302(1935).

51. Hagman, Nils, *Finnish Paper and Timber J.* 18, no. 1:32-34, 36-38, 40-41 (Jan. 15, 1936).

52. Bergström, Hilding, and Vallin, Sten, Medd. Statens Undersöken-Försöksants, Sötvattenfosket, *Kgl. Lantsbruksstyrelsen* No. 13. 1937. 17 p. C.A. 34:2597.

53. Bergström, Hilding, *Svensk Papperstidn.* 42, no. 8:223-228 (April 30, 1939).

54. Extrom, J. A., and Farner, D. S., *Paper Trade J.* 117, no. 5:27-32(July 29, 1943); Tech. Assoc. Papers 26:193-198 (1943).

55. Van Horn, Willis M., Anderson, J. B., and Katz, Max, *Tappi* 33, no. 5:209-212(May, 1950).

56. Bergström, Hilding, and Trobeck, K. G., *Svensk Papperstidn.* 48, no. 10: 246 (May 21, 1945).

57. Allen, D. E., *Pulp & Paper* 25, no. 2:56, 58-59(1951).

58. Gehm, Harry W., *Tappi* 34, no. 5:120-122A(May, 1951).

59. Moggio, W. A., La. State Univ., *Eng. Expt. Sta. Bull.* No. 13. 1948.

60. Barnes, George B., Moggio, W. A., and Colmer, A. G., La. State Univ., *Eng. Expt. Sta. Bull.* No. 19. 1950.

61. Moggio, W. A., and Gehm, H. W., *Sewage Ind. Wastes* 22, no. 10:1326-1337 (1950).

62. Moggio, W. A., *Tappi* 35, no. 4:150-151A(April, 1952).

63. Crawford, Stuart C., *Paper Mill News* 69, no. 36:12, 14, 17-18(Sept. 7, 1946).

64. Porter, C. C., and Bishop, Fred W., *Ind. Eng. Chem.* 42:102-106(1950).

65. Sapp, J. E., *Paper Trade J.* 130, no. 26:22-24(June 29, 1950).

66. *Tappi* 35, no. 11:96A(Nov., 1952).

67. Hodge, Willard W., and Morgan, Philip F., *Sewage Works J.* 19, no. 5: 830-862(Sept., 1947).

68. Morgan, Philip F., *Paper Trade J.* 126, no. 20:41-45(May 13, 1948); Tech. Assoc. Papers 31:106-110(1948).

69. *Paper Ind.* 29, no. 10:1405-1406 (Jan., 1948).

70. Morgan, Philip F., *Sewage Works J.* 21, no. 3:512-521(March, 1949).

71. Palladino, A. J., *Paper Ind.* 31, no. 3:341-342(June, 1949).

72. *Paper Ind.* 32, no. 7:712-713(Oct., 1950).

73. Palladino, A. J., Purdue Univ., Eng. Bull. Extension Series No. 72:316-329 (1950).

74. Palladino, A. J., *Sewage Ind. Wastes* 23, no. 11:1419-1424(Nov., 1951).

75. Palladino, A. J., *Paper Mill News* 74, no. 37:91-92(Sept. 15, 1951).

76. Palladino, A. J., and Baigas, J. F., Purdue Univ., Eng. Bull. Extension Series No. 76:434-440(1951).

77. *Paper Trade J.* 135, no. 6:12(Aug. 8, 1952); *Chem. Eng. News* 30, no. 34: 3543(Aug. 25, 1952).

78. Bloodgood, Don E., and Erganian, George, *Sewage Works J.* 19, no. 6:1021-1031(Nov., 1947).

79. Bloodgood, Don E., and Hargleroad, James C., *Paper Trade J.* 127, no. 22:43-48 (Nov. 25, 1948); Tech. Assoc. Papers 31:230-235(1948).

80. Bloodgood, Don E., *Tappi* 33, no. 7:317-320(July, 1950).

81. Chêne, M., Deissenberg, Ch., and Lion, N., *Ann. Inst. Polytechnique* 1952: 45-53.

82. American Public Health Association, Committee on Sewage Disposal, Engineering Section, *Sewage Works J.* 20, no. 6:1025-1031(Nov., 1948).

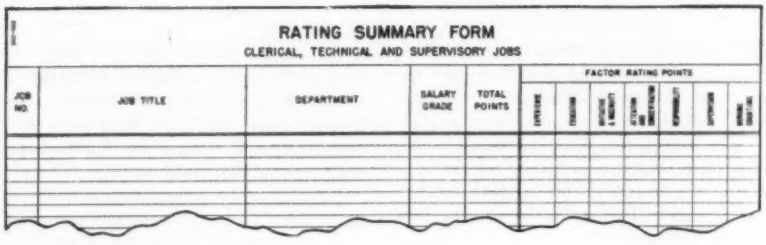
83. Krancher, Carl G., Purdue Univ., Eng. Bull. Extension Series No. 76:464-478 (1951).

Job evaluation . . .

—preparing job descriptions and rating job requirements

Part 4 of a series

J. A. KELLER*


RATING SUMMARY FORM
CLERICAL, TECHNICAL AND SUPERVISORY JOBS

JOB NO.	JOB TITLE	DEPARTMENT	SALARY GRADE	TOTAL POINTS	FACTOR RATING POINTS						

WHEN MANAGEMENT HAS LAUNCHED the job evaluation program, selected the plan to be used, and announced the program to employees, the company is ready for the major step—job analysis.

Job analysis proves for each job: (1) An accurate description; and (2) an impartial rating of the actual responsibilities and requirements of the job.

The success and fairness of a job evaluation plan require that all concerned know "what" is being evaluated and "what" is being compared. Jobs must be correctly and concisely described in terms that give a clear picture of the work which is being performed. This step is vital both for job evaluation and for industry and area comparisons between jobs in different companies.

The job description should be set up in a standard form which shows:

1. The title of the job; standard titles should be used if possible
2. The department and location
3. The principal functions of the job
4. Major duties and activities
5. Scope of responsibility or supervision
6. Equipment used (if pertinent).

In larger companies an index system should be developed so that jobs can be coded by department and section. Such classification will be of considerable value in filing and recording job data and in administering salaries and wages.

Job description

The accuracy of a job description depends upon the care with which the job information is gathered. This information may be gathered:

1. By actual study of the job
2. By discussion with the supervisor
3. By having a questionnaire, outline, or description prepared by the employee.

In practice, job descriptions are usually made up in a combination of all three ways. No pat formula on the best way to obtain job information can be given, since the type of work performed will affect the most desirable means of gathering the information.

—In some cases, the employee on the job may be much more aware of the important details of the job

—In other cases the supervisor may be in a better position to see the over-all responsibility or importance of the work.

By viewing the job with both the employee and the supervisor there is less probability of overstressing or omitting certain requirements or responsibilities of the job.

Care must be exerted to find the significant details of the job which may affect the factor rating without having the description bogged down in details.

Using a standard form and standard terminology as much as possible will help in writing concise descriptions. In preparing job descriptions, use descriptive words and action verbs and avoid technical or shop jargon.

Before being accepted as a basis for job evaluation, descriptions should be approved by the supervisor responsible for the activity as giving an accurate description of the job. It is always desirable, and on higher level jobs it may be necessary, to have the descriptions also reviewed by the one on the job.

Job rating

The rating of jobs—that is, evaluating the requirements and responsibilities of the job to determine its relative worth—can begin as soon as job descriptions are completed and approved.

There are several basic rules which should be followed in establishing *who* is to rate the jobs:

1. It is generally best to set up a job rating committee, representing factory, office and sales management, with a representative from personnel. This committee will be able to pool its knowledge and combine first-hand knowledge of the jobs with a broad approach to the over-all company job pattern.

2. An employee should not take part in rating his own job or jobs at a higher level of responsibility than his own. The few key jobs of committee members should therefore be rated by top company management.

3. The supervisor over the activity involved should participate in the ratings or in discussing them at the time they are made.

The persons doing the rating should be prepared to spend a good share of their time on job rating during the initial job evaluation program.

Ground rules

The "ground rules" on *how* to rate jobs include the following:

1. Rate jobs by factors (experience, education, etc.), not by the whole job. This automatically reduces "opinion" and forces more rational judgments.

2. Normal requirements of the job should be rated—not what conceivably could happen.

3. The qualifications of the person on the job should not be rated unless they are the same as the requirements of the job.

4. Select a cross-section of all jobs covered and rate them. Then take up jobs department by department.

5. Schedule job ratings; set a timetable for completing the work; see that it is kept.

6. When all ratings are done, total point values for jobs.

7. Compare factor ratings job by job.

Only when job ratings have been carefully checked and reviewed—when management agrees that the point values reflect the proper level of responsibility between jobs—should they be used in building a wage and salary structure.

*Vice president, George Fry & Associates, consulting management engineers, Chicago and New York, N. Y.

Paper and paperboard making—XXVIII

HARRY WILLIAMSON

Wire Mesh Drainage by Number of Openings per Square Inch

IN THIS SERIES the wires are arranged in groups not to exceed a maximum spread of 420 openings per square inch and with a minimum spread of 40. The classification table was arranged in sequence of increase in "time seconds;" in this grouping the time element and other factors are recorded for study relationship to the SEQUENCE increase in the NUMBER OF OPENINGS.

Group No. 1—Five fourdrinier wires, construction all Twill Flat weave

Number of Openings; 1800-2200 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
19	Twill Flat	1800	22.7	5.130	385.0
20	" "	1890	22.3	5.705	377.5
22	" "	2000	20.8	4.870	402.0
21	" "	2160	17.1	5.850	375.0
23	" "	2200	2.08	5.190	385.0
Average test results		2025	21.85%	5.349 sec.	384.9
Maximum spread		400	5.6%	0.98 sec.	27 cc.

The reader will note that all the wires in Group No. 1 are of the same weave and that two of them have exactly the same per cent open area. There is NO evidence of definite change of time rate of drainage due to change in number of openings in this sequence range.

Wire No. 22 with 2000 openings shows 4.87 seconds, while wire No. 19 with 1800 openings—200 LESS—shows 5.130 seconds. Wire No. 23 with 2200 openings—200 MORE—shows 5.190 seconds.

Group No. 2—Six fourdrinier wires; 2 Twill Round, 2 Twill Flat and 2 Plain Round weave

Number of Openings; 2201-2600 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
9	Twill Round	2242	26.4	5.03	388.3
1	Plain Round	2242	26.4	5.03	388.3
2	Plain Round	2360	26.4	4.01	405.0
24	Twill Flat	2400	19.8	5.47	381.6
10	Twill Round	2419	25.9	5.49	380.0
25	Twill Flat	2600	19.1	6.56	367.5
Average test results		2377	24%	5.265sec.	385.1
Maximum spread		358	7.3%	2.45 sec.	37.5 cc

In group No. 2 we find two wires with exactly the same number of OPENINGS, 2242; the same per cent OPEN AREA, 26.4, and the test results are exactly the same. One wire is Twill and the other Plain weave. Both wires have ROUND warp strand. From this we may tentatively infer that in this bracket of number of openings, other things being equal, the TYPE of weave, plain or twill, does NOT affect the time rate of drainage. No. 2 wire, with 160 openings more but with only the same 26.4 per cent of open area, shows the fastest time of the whole classification table, namely 4.01 seconds. Reference to the key table shows this wire to have a "count" of two more SHUTE wires per square inch; to have more wire strands and still the same per cent open area the shute wires must be of lower gauge. In contrast we find wire No. 25, with a Twill weave and FLAT warp wires, having a "count" of 50 x 52, making 2600 OPENINGS with only 19.1 per cent of open area. Here we have 9 LESS warp wires, but the SHAPE is flat instead of round. We have an increase in the number of shute wires to bring the number of openings to a higher "count." The test results show the LONGEST drainage time of this group —6.56 seconds.

From these data we may ask ourselves, "does the shape of the warp wire materially affect the time rate of drainage?"

Group No. 3—two fourdrinier wires; one Plain Round and one Plain Flat

Number of Openings; 2601-3000 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
3	Plain Round	2860	27.4	5.31	382.5
13	Plain Flat	3000	20.8	6.08	372.5
Average test results		2930	24.1%	1.77 sec.	377.5
Maximum spread		140	6.6%	5.69 sec.	10.0 cc.

In this group of only two wires, with only a difference in number of openings of 140, we find a very marked difference in per cent of open area and an appreciable difference of increase in time rate of drainage. An increase of 1.77 seconds expressed as a percentage of 5.31 seconds is 33.33 per cent. This is the first instance where we can say a marked influence on the drainage time would be felt in PRACTICAL operation. We must therefore examine more closely the DESIGN of construction in relation to the SHAPE of the warp wires to try and find why the very small differ-

This concludes the excerpts from the author's forthcoming book covering all phases of paper and paperboard manufacture. Parts I through XX appeared from March 1950 to December 1951, while Parts XXI through XXVIII ran serially from August 1952. Mr. Williamson's book is to be published by Fritz Publications Inc.

ence in total number of openings results in such a large increase in drainage time.

Reference to the key table gives us 65 Round warp wires and 44 shute wires to total a "count" of 2860 openings for wire No. 3 against 60 FLAT warp wires and 50 shute wires for a total count of 3000 openings for wire No. 13. As both wires are Plain weave, we have a direct contrast of 65 Round warp wires against 60 Flat warp wires plus an increase of 6 shute wires. As the increase of 6 shute wires is almost offset by the decrease of 5 warp wires, we can ask ourselves the question, "DO 60 FLAT WARP WIRES PER INCH OF WEAVE fill up more open space than 65 ROUND WARP WIRES and is this the reason for this marked increase in time rate of drainage?"

Group No. 4—three fourdrinier wires; one Plain Round, one Twill Round, one Plain Flat

Number of Openings 3001-3400 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
14	Plain Flat	3360	19.7	7.220	?
4	Plain Round	3360	26.7	6.090	370.0
11	Twill Round	3360	25.4	5.840	376.5
Average test results		3360	23.9%	6.386 sec.	373.25 cc
Maximum spread		NONE	7.0%	1.38 sec.	6.5 cc

In this group of three wires we find exactly the SAME NUMBER OF OPENINGS per square inch with three different results in per cent OPEN AREA and time seconds drainage. We also have two types of weave, plain and twill, and two types of shape, round and flat. In this bracket then we have before us all the factors concerned with construction resulting in the SAME NUMBER OF OPENINGS. Reference to the key table show the DESIGN of wire No. 4 to be PLAIN Round with a "count" of 70 warp wires and 48 shute wires and wire No. 11 to be TWILL Round with exactly the same number of warp and shute wires.

The ONLY difference is in the type of weave and, as far as this test is concerned, we may say that in the range of 3360 openings per square inch of weave with equal warp and shute wires the TWILL will give 1.3 per cent LESS open area than the plain weave. However, we are faced with the remarkable fact that with LESS open area the tests show the twill to have a BETTER time rate of drainage than the round—5.84 sec. against 6.090, a difference of 0.25 seconds or 4.1 per cent. The reader will recall that in group No. 2 with 2600 openings per square inch there was NO difference in open area and the time rate of drainage was not affected by the difference between twill and plain weave.

We must also note that all three wires in this 3400-opening group show a relatively much SLOWER time rate of drainage.

Wire No. 14 with a PLAIN FLAT weave may be compared to wire No. 4 with a PLAIN ROUND weave. Wire No. 14 with 60 Flat Warp wires and 56 shute wires yields only 19.7 per cent open area against 26.7 per cent for wire No. 4 with 70 Round warp wires and 48 shute wires. In this instance the tests show the relatively much smaller open area to be consistent with the time rate of drainage, namely 7.22 seconds, in ratio to 6.090 seconds. This difference of 1.13 seconds expressed as a percentage of 6.090 seconds is the appreciable difference of 18.55 per cent.

In the higher brackets of NUMBER OF OPENINGS PER SQUARE INCH it is apparent that DESIGN of weave or arrangement of warp wires to shute wires and SHAPE of warp wire used, round or flat, does affect the per cent of open area and does also affect the time rate of drainage. As we go into the still higher brackets, it will be interesting to note if this tendency continues.

Group No. 5—four fourdrinier wires; one Plain Flat, one Plain Round, one Twill Flat, and one Twill Round

Number of Openings 3401-3650 inclusive

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
15	Plain Flat	3600	19.3	6.885	363.0
26	Twill Flat	3600	18.1	7.950	360.0
5	Plain Round	3640	26.3	5.850	376.5
12	Twill Round	3640	25.2	5.470	381.6
Average test results		3620	22.225%	6.539 sec.	370.3
Maximum spread		40	8.2%	2.48 sec.	21.6

In this group we have a fine opportunity to compare directly the factors of weave design and shape of warp wires. Wires 15 and 26 have exactly the same NUMBER of openings; wire 26 having 1.2 per cent LESS open area than wire 15. The design of No. 15 is Plain Flat with 60 warp wires and 60 shute wires; No. 26 is Twill Flat with 60 x 60 warp and shute. The ONLY difference is TYPE of weave which shows the TWILL weave at 3600 openings per square inch yields 1.2 per cent LESS open area through which the water can drain. By the time rate of drainage test this difference of less open area results in an increase of time of 1.065 seconds or a SLOW DOWN of drainage of 15.47 per cent.

Wires 5 and 12 have exactly the same "COUNT," 70 x 52; both are woven with ROUND warp wires, and, again the ONLY difference is the TYPE of weave. In this comparison the Twill weave yields 1.1 per cent less open area than the Plain weave, BUT we again have the inconsistent test result of a FASTER drainage time of 0.38 seconds, or 6.5 per cent for less open area.

In the bracket of 3401-3650 openings per square inch the design of weave using FLAT warp wire, either Plain or Twill, will definitely yield LESS open area and INCREASE time rate of drainage over the use of ROUND warp wire. The twill FLAT weave, in this range, yields the SLOWEST time rate of drainage.

Group No. 6—one Twill Flat and one Plain Round. Total, two wires

Number of Openings. 3651-4000 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
27	Twill Flat	3720	17.2%	6.080	372.5
6	Plain Round	3900	25.6	5.310	382.5
Average test results		3810	21.4%	5.695 sec.	377.5 cc
Maximum spread		180	8.4%	1.77 secs.	10.0 cc

Reference to the key table gives us a construction of 75 Plain Round warp wires to 52 shute wires for No. 6 and 60 Flat warp to 62 shute wires for No. 27. It is significant that the addition of the warp and shute wires in the design of BOTH weaves shows a total of 127 to 122 wire strands, and only 5 strand wires more per square inch of weave in wire No. 6 yields 180 more openings per square inch.

Again we find that the Twill FLAT weave yields far less open area, and the time rate of drainage is correspondingly higher. In the bracket of 4000 openings per square inch we find a difference in time rate of 0.77 seconds or an INCREASE of 14.5 per cent in time rate of drainage.

Group No. 7—two fourdrinier wires; one Plain Round and one Plain Flat

Number of Openings. 4001-4500 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
16	Plain Flat	4200	21.2	8.190	342.0
17	Plain Round	4480	27.2	5.480	380.0
Average test results		4340	24.2%	6.835 sec.	361.0 cc
Maximum spread		280	6.0%	2.71 sec.	42.0 cc

In this maximum 4500-openings group we find the same weave but a wire with FLAT warp and a wire with ROUND warp. The flat warp wires number 70 with 60 shute, and the round warp has 80 strands with 56 shute. The flat type yields an open area 6 per cent LESS than the round and this is shown in the test to be equal to an increase in time rate of drainage of 2.71 seconds. Expressed as a percentage of the lower figure of 5.48 seconds, this simply means an INCREASE of time rate of drainage of 47.62 per cent.

Group No. 8—three fourdrinier wires; two Plain Flat and one Plain Round

Number of Openings. 4501-5040 inclusive.

Wire No.	Type Construction	Number of Openings	% Open Area	Time Secs. 220 cc.	Volume Free Water cc.
17	Plain Flat	4620	20.5	8.860	337.5
8	Plain Round	4800	26.8	6.885	368.0
18	Plain Flat	5040	19.6	9.320	332.5
Average test results		4820	23.3%	8.355 sec.	344.3 cc
Maximum spread		420	7.2%	2.435 sec.	30.5 cc

This is the group with the greatest NUMBER of OPENINGS per square inch of weave of all the 27 wires submitted to this drainage test. All Plain weave, the two wires with FLAT warp strands again show a big increase in drainage time over the wire with ROUND warp strands. Expressed as a percentage of 6.885 seconds the flat warp wire with 4620 openings has an increase of drainage time of 28.68 per cent and the flat warp wire with 5040 openings an increase of 35.36 per cent.

Use of radioisotopes in pulp and paper mills

LEO WALTER*

FROM TIME TO TIME new discoveries have to remain in the laboratory stage for considerable time before they find industrial application. Radiophotography is one of these discoveries, which only fairly recently emerged from years of research into practical applications. Although much has been published on the medical use of isotopes, little is known about their use in the pulp and paper industry.

The science of isotope application

Industrial application of radioactivity is based on the ability of radioactive rays to penetrate opaque materials where light does not penetrate. Isotopes (reactive materials) may be called "industrial eyes." They see where human eyes or conventional photographic instruments cannot see. The simplest and oldest application of this is X-ray photography, but X-ray has the well-known limitation that it lacks penetration. It can penetrate skin and flesh, but not thick steel. Radiation from isotopes on the other hand, can penetrate great thicknesses of steel and other industrial materials. This application of radioactivity is known as industrial radiography.

Radium—a natural isotope—provides a source of rays. But radium is fabulously expensive and takes an impractical long time to penetrate some thick materials. Much more effective is cobalt 60, which is less penetrating than radium but costs much less and acts more quickly. In addition to cobalt 60, other isotopes are being used which are superior for certain jobs. Among these are iridium 192, used for radiographing welds and medium to light castings, and sodium 24.

First, what is an isotope? An isotope is a chemical element which has been bathed in radioactivity in an atomic pile and retains radioactive properties which it then proceeds to emit until expended. The power of radioactive rays is measured in curies. The number of curies determines the penetration or "punch." The expenditure of an isotope's radioactivity is measured in terms of its "half-life," that is, the amount of time required to exhaust half the isotope's radioactivity. This length of time will be taken to expend half of the remaining half (or one quarter) and again to expend half the remainder, *ad infinitum*.

In applying radioactivity to industrial use, it is well to consider three factors to determine the use of isotope.

*Consulting engineer, Cheltenham, England.

1. The "punch" or penetration of the isotope.

2. The length of its "half-life." It may be too short to be practical or too long to be economical.

3. Availability of the isotope. There are about 60 to 70 useful isotopes, but isotope engineers are using only eight to 10 of them.

One of the main reasons why the practical application of isotope radiation has only made slow advance is the safety factor. Only highly skilled engineers are in a position to handle isotopes, and only some jobs allow their practical industrial use at the present time. Nevertheless, the practical use of isotopes in pulp and paper manufacture has made great progress during the last years, as described in the following examples, taken from various sources at random. These applications show clearly that further development of isotope technique will give the paper mill engineers valuable help in solving a diversity of problems. The use of isotopes not only makes new solutions of problems hitherto unsolved now possible, but also replaces older methods by modern, quicker and less costly methods.

Isotopes save long shutdown at Quebec pulp plant

At Anglo-Canadian Pulp & Paper Mills, Quebec City, three sulfite pulping digesters (welded steel pressure vessels 16 ft. diameter, 58 ft. high) were out of service because of suspected serious corrosion. These digesters have 1¼-in. steel plate with 7-in. thick double brick lining. Cracks in the lining indicated acid might seep through and corrode the steel shell. It was considered impossible to determine how serious this corrosion was without chipping out the 10,000 bricks which constituted the lining. A long period of lost production was indicated, but a report of Dr. J. G. Mackenzie, president of Atomic Energy of Canada Ltd., broadcast on a CBC program, cited research regarding digester corrosion by L. R. Thiesmeyer, who heads the Pulp and Paper Research Institute of Canada.

This report, plus previous personal contact, convinced the research and engineering groups of Anglo-Canadian that the newly invented "gammage" could measure the extent of corrosion in their digesters. Arrangements were made with Isotope Products at Oakville, Ont., a specialized firm for a radiographic survey, and soon radiographic examination had been completed on the two lined digesters. Readings were made in complete circles every 2 feet down the entire length of both digesters. Points of corrosion were measured in detail and recorded with precision on the instrument chart. The pattern of corrosion was then transferred to a blueprint of the digester wall by means of the gamma-gauge, an instrument which measures intensity of radioactivity. Then a number of bricks were removed from several points in the digester where corrosion was indicated. It was found that the actual corrosion at these points corresponded to that indicated by the "gammagage." The paper mill stated in a letter to Isotope Products, "we have received official confirmation from the boiler inspectors that we will be able to operate Nos. 7 and 8 digesters at reduced pressure, and it is expected that the patching of the lining and curing will be completed this week."

It took approximately 40 hours for Isotope's "gammagage" team to completely test and profile both digesters. The alternative would have involved pneumatic drilling and removal of some 20,000 special type bricks, and finally relaying new bricks after examination of the shell. The "gammagage" is an instrument developed and produced by Isotope Products Ltd., which directs the gamma rays of cobalt 60, iridium 192 and other isotopes through metal and other materials; measures the wall thickness by automatically determining the amount of rays absorbed in transmission or by reflection. Readings are instantaneously recorded on a dial of the instrument and continuously profiled by a pen-recorder.

Papermaking controlled by isotope instrument

It should be of special interest that the oldest operating paper mill in Canada (1826) has installed the newest in control equipment. At Don Valley Paper Mill, Toronto, a betameter is now controlling basis weight—continuously in production, automatically adjusting the machine to maintain pre-set specifications. Don Valley uses a fourdrinier machine to produce some 20 tons daily of cover, blotting paper, bristol and tag stocks. Like other mills, Don Valley has up to now relied on sampling and manual adjustment to maintain the basis weight. While raw materials and other factors have been brought under a certain degree of control, it has not been previously possible to control, automatically, the basis weight at production stage.

Isotope Products, Oakville, installed a betameter for trial runs. On the strength of these trials, the betameter recording device was ordered, and it was decided Isotope would investigate the feasibility of linking this equipment with remote control mechanism that operates the gate. The gate regulates the flow of materials to the paper machine; to control this valve is to control basis weight. Isotope Products tackled the problem in cooperation with Bristol Instrument Co., and the mechanism was devised to link the betameter directly with the gate control.

The betameter is located at the wet end of the machine. One arm of the instrument emits beta rays which penetrate through the continuous band of wet paper and are recorded by a detection device in the upper arm of the betameter. The relative basis weight of the paper being produced determines the amount of beta rays absorbed. This is electronically calculated and compared with pre-set standards. Any deviation activates controls which change the gate setting to maintain standards.

The mill manager wrote to this firm: "This instrument now does for the machine tender what the automatic pilot does for an airplane pilot." The machine operator merely sets the machine for production of a prescribed paper, zeros the control, and flicks a switch.

The instrument is measuring a sheet of paper off the wire at the wet end of the machine when the paper is 80 per cent wet. Yet it controls the production to give a specified finish dry basis weight. The installation represents a saving in material and insures a greater degree of uniformity. It has cut down weight variations by as much as 50 per cent.

Instruments

Geiger Counters are constantly referred to in reports on atomic energy and radio activity. Actually geiger counters are only one of several instruments which detect and measure radiation. Geiger counters are small rugged units which record the number of radioactive rays. They are used in prospecting uranium and hunting for radioactive contamination.

Ion Chambers are air or gas filled chambers; generally large and steady in operation, which measure the strength of radioactive fields. Their use varies from use in instruments for atom bomb survey to industrial equipment such as the betameter.

Proportional Counters similar to ion chambers, are more sensitive but less sturdy; and more adapted to laboratory use. Like the former, proportional counters can distinguish between alpha, beta and gamma rays. Geiger counters cannot.

Scintillation Counters the latest development, are the most sensitive detectors yet devised. Radioactive rays hit crystals (not unlike crystal coatings on television tubes) and produce tiny flashes of light. These flashes are electronically amplified and recorded. Scintillation counters are used in sensitive detecting instruments such as the gammagage.

Dosimeters are of various types, but almost all are based on the old principle of the gold leaf electroscope. They are used to add up the amount of radiation a person or place is subjected to and thus to keep constant check on the safety of the personnel exposed to radiation.

A PAPER CUP impregnated and specially treated with an additive has been developed and is capable of holding a head on beer. . . .!

The **FIRST SHEETS of PAPYRUS** capable of carrying writing on both sides appeared during the reign of the Roman Emperor Claudius. The papyrus made earlier was always thin and transparent and would only take writing on one side.

Rod Ruth

ENORMOUS SLEEVES expanded with pasteboard and resembling pear-shaped balloons were all the rage among women of fashion just before Victoria ascended the British throne.

Odd Bits At the commencement of the Eighteenth Century old-fashioned stampers and Hollanders worked side by side macerating papermaking stock in many mills.

The Paper Industry Association News

Straw Storage Losses Chosen for Tappi Project

Apparent losses of straw occurring in yard storage of the straw-baled ricks has been chosen as the 1953 research project of the Tappi Fibrous Agricultural Residues Committee. The choice was made February 16 at a meeting of the group in New York, N. Y.

According to S. I. Aronovsky of the Northern Regional Research Laboratory in Peoria, Ill., the general plan of attack will be to build up four full-size straw baled ricks in a mill yard. The straw bales will be tested for moisture and weighed as they are used to build up the ricks. The tops of the ricks will be covered with borax for protection from microbial attacks. One rick will be torn down and tested extensively after three months, one after six, one after nine, and one after a full year. The losses in weight, if any, will then be calculated. Observations on the physical condition of the straw and determination of the alkali solubility will be made on representative samples both on stacking and destacking.

Mr. Aronovsky and L. E. Eberhardt of Bauer Brothers Co., Springfield, Ohio, are to contact several universities and institutes to try to obtain a research man for the project. R. F. Burns of Weston Paper Co., Terre Haute, Ind., offered the facilities of his firm's straw yard and yard crew to carry out these experiments. As soon as a qualified research man has been located, the project will be reported and submitted to the Tappi executive committee meeting for action. Attempts will be made to get this preliminary information and Tappi approval in time to start work on the project with this year's crop (in July).

Several other subjects were discussed as possibilities for the research program, which, it was pointed out, must serve a definite need of the strawboard industry and should be completed within a reasonable time. Among these subjects were: (1) ways and means of reducing stream pollution from strawboard mills; (2) more accurate estimation of the yield of corrugating pulp from straw; (3) improvement of pulping and refining methods in strawboard mills, and (4) slime control in strawboard mills.

Those in attendance at the meeting, in addition to Mr. Aronovsky, Mr. Eberhardt and Mr. Burns, were: E. C. Lathrop of the Northern Regional Research Laboratory; J. E. Atchison, Puerto Rico Paper Products Inc.; Frank Doenges, Weston Paper Co.; N. H. Carpenter, Muskingum Fiber Products Co.; Earl Knapp, J. R. Little and D. L. Owen, all of Hinde & Dauch Paper Co.; R. A. Springer, Diamond Alkali Co., and G. A. Zinkil, Central Fiber Products Co.

Need For Trained Technical Personnel Discussed at Ohio Tappi

The task of recruiting trained technical manpower from the ranks of college graduates has become a serious and highly competitive enterprise, according to Dr. J. Edward Todd of the Institute of Paper Chemistry at Appleton, Wis. Addressing the March meeting of the Ohio Section of Tappi, Dr. Todd declared that where there were 45,000 to 50,000 engineering graduates two or three years ago, there will be only 20,000 available this year to fill an estimated 50,000 to 75,000 openings.

"Signing up new personnel is more difficult than it sounds," the speaker continued, "and it is customary for the employer to expect more than he gets, human nature being infinitely complex and unpredictably dynamic." Since 1949, he said, the industries that have grown most rapidly in their order of growth are natural gas, aluminum, paper, and the chemical mineral groups. The paper industry has doubled since 1949 and now is making annual sales of $8 billion from plants valued at $6 billion.

Dr. Todd noted that the selection of superior research personnel has been adequately summarized by George Bennett, president of Psychological Corp., as follows: A complete analysis should consist of an evaluation of the candidate's achievements at school and at work, an appropriately planned and conducted interview, and finally, if possible he should be given a properly selected battery of tests.

Personal interview

There is no substitute for the personal interview of the candidate alone and also in a group situation, Dr. Todd pointed out. The group members may include board members who make the final decision on employment of new personnel and possibly a psychologist. In groups certain situations may be created to obtain the reaction of the candidate.

As an additional check on the qualifications of the candidate a battery of selected tests may be used and the candidate's rating compared with the ratings of personnel already employed in the type of work he is being hired to perform. Dr. Todd classified the tests into such other groupings as knowledge tests, intelligence tests, productive thinking tests, character tests, questionnaires, and projective tests.

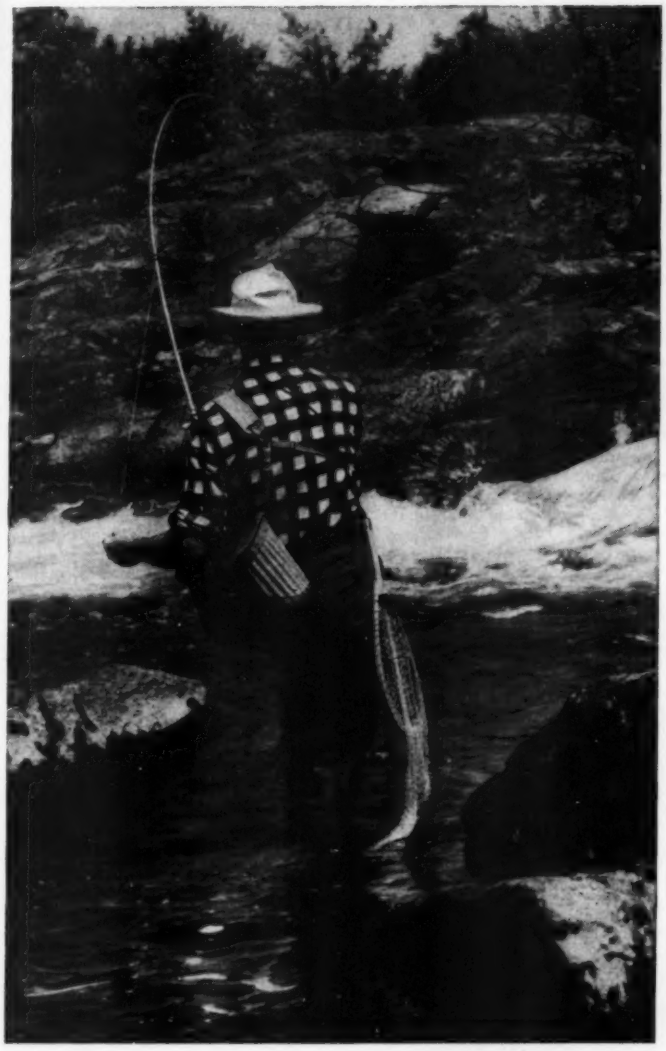
Summarizing his talk, Dr. Todd declared that many factors have developed the need for technical personnel with certain essential qualifications. Tools and methods of making the proper selection for the specific jobs in the paper industry are within the reach of all employers and are now being widely used. Untrained persons should go slow, however, on interviews and tests and should not hesitate to get professional help from colleges and universities or trained consultants in the employment field in selecting personnel for technical jobs.

Measurement and Control to Highlight Annual Spring Meeting of Lake Erie Tappi

The annual two-day spring meeting of the Lake Erie Section of Tappi will be staged at the Hotel Carter in Cleveland May 21 and 22. The subject of this year's discussions will be the "Measurement and Control of Paper and Paperboard Manufacture and Conversion—Present and Future."

General chairman of the conference will be J. W. Noll of Munroe Falls Paper Co., Munroe Falls, Ohio. While the meeting is sponsored by the Lake Erie Section, associations cooperating in the project include the Cleveland Section of the American Society for Quality Control, the Cleveland Section of the Instrument Society of America, and the Engineering Division of Tappi.

L. A. Moore, assistant chief engineer for The Black-Clawson Co. of Hamilton, will serve as moderator for the Friday sessions. Speakers will be Ralph W. Peters, assistant paper mill superintendent, Eastman Kodak Co.; William H. Aiken, technical director for Gardner Board & Carton Co.; Sher-



WIN A PRIZE in the Second Annual Tenax Fishing Contest

SPONSORED BY
LOCKPORT FELT COMPANY
FOR

Paper, Pulp and Paperboard Mill Employees

ANYWHERE IN THE U.S.A.

Knowing how many of you get great pleasure out of fishing, Tenax Felts are giving you something extra to fish for . . . 46 worthwhile prizes. We sincerely hope you will be one of the lucky ones to win a prize this year.

These Prizes must be won!

NATIONAL GRAND PRIZE
10 H.P. JOHNSON OUTBOARD MOTOR

For the fish nearest the weight of all-time record fish of same variety, as listed in FIELD AND STREAM RECORD BOOK.

15—1ST PRIZES ..... $100 SAVINGS BOND
(1 each variety of fish listed on official entry blank)

15—2ND PRIZES ..... $50 SAVINGS BOND
(1 each variety of fish)

15—3RD PRIZES ..... $25 SAVINGS BOND
(1 each variety of fish)

Get your entry blanks at your own mill now

See your bulletin board or ask your mill foreman for easy contest rules, official entry blanks and list of fish for which prizes will be awarded. Contest starts April 1—ends midnight, October 1, 1953. Get started early—because in this contest amateurs can win as easily as experts. First, second and third prizes will be awarded in *each* of 15 separate classes—for the heaviest of 15 different varieties of fish, from yellowtail to largemouth bass! In addition, you may win the National Grand Prize! *So . . . let's go fishin'!*

LOCKPORT FELT COMPANY • NEWFANE, N. Y.

GOODBYE TO "SUPPLY TROUBLES"

Enlarged plant insures you immediate delivery of

VINOL polyvinyl alcohol

Are you a user of Polyvinyl Alcohol? You can be sure of an adequate supply—now possible through the enlarged facilities of The Colton Chemical Company, exclusive producers of VINOL Polyvinyl Alcohol. Uniformity and high quality of VINOL Polyvinyl Alcohol are rigidly controlled. You can depend on VINOL.

VINOL Polyvinyl Alcohol is extensively used in the Adhesive, Textile, Paper and Packaging Industries. VINOL is non-gelling, white, free-flowing, fast-dissolving and uniform.

SPECIFICATIONS

VINOL Polyvinyl Alcohol is available in two grades:

	FH-400 (medium grade, fully hydrolyzed)	FH-500 (high viscosity, fully hydrolyzed)
Hydrolysis	98.5—100%	98.5—100%
Insolubles (in water)	1.0% max.	1.0% max.
Volatiles	5.0% max.	5.0% max.
Ash	2.0% max.	2.0% max.
pH	6 - 8	6 - 8
Viscosity (4% in water)	20 - 30 cps	35 - 50 cps
Gel characteristics	Non-Gel	Non-Gel
Color	White	White

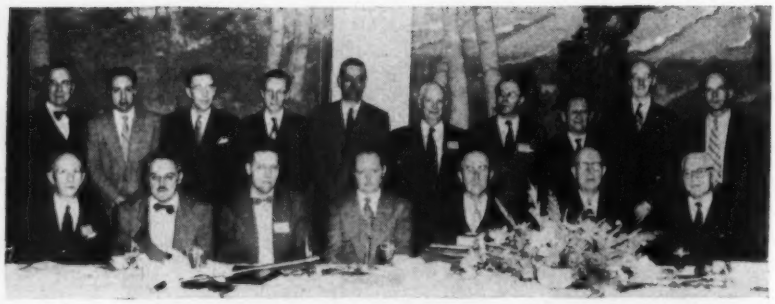
THE MARK OF QUALITY

For samples and information, write Dept. 433

THE COLTON CHEMICAL CO.

1545 E. 18TH ST. CLEVELAND 14, OHIO

Manufacturers of VINOL Polyvinyl Alcohol—VINAC Polyvinyl Acetate in Solid, Solution and Emulsion Form—Phenol Formaldehyde Solutions



HEAD TABLE GUESTS at February luncheon honoring Prof. C. E. Libby, retired head of the New York State College of Forestry's pulp and paper department; the gathering, a joint project of the alumni of Syracuse and of the University of Maine, was staged in the Roosevelt Hotel, New York, N. Y.; Professor Libby, who has recently been named to head the newly established department of papermaking at the School of Forestry of the North Carolina State College of Agriculture and Engineering, was presented several gifts by the alumni groups; those in the picture are (seated, l to r): Ken P. Geohegan, vice president of Howard Paper Mills Inc. and former president of Tappi; William R. Willets, Titanium Pigments Corp.; Clark E. Snook, Nopco Chemical Co.; Marsden C. Hutchins, Johns-Manville Co.; Professor Libby; Everett K. Mansfield, Ellis Paperboard Products Inc., and J. L. Ober, Scott Paper Co.; in the second row: Chancellor William P. Tolley of Syracuse; Ralph David, *Pulp & Paper;* Floyd C. Peterson, Dow Chemical Co.; Dr. Edwin C. Jahn, Syracuse; Frederick H. Flaherty of the Syracuse alumni; Harry E. Weston, Superintendents Association; Douglas Jones, Technical Section, CPPA; Raymond S. Hatch, Hudson Pulp & Paper Co.; Prof. Frederick W. O'Neil, Prof. Libby's successor at Syracuse, and Dean Walter J. Peterson of North Carolina State College

man C. Lloyd, Electrochemicals Division of E. I. duPont de Nemours & Co.; Henry Ehrisman, manager of the pulp and paper department of The Foxboro Co.; John Green, steel industry sales manager of Minneapolis-Honeywell Regulator Co.; Irving Lefkowitz, Case School of Applied Science, and John F. Langmaid Jr., assistant to production manager of S. D. Warren Co.

Principal speaker at the annual dinner Thursday night is to be H. A. Black of the industrial relations department of the Mead Corp., Chillicothe, Ohio. His topic will be, "The Greatest Measurement and Control Problem of All—the Human Being."

Three plant tours have been arranged for Friday morning. They include Republic Steel Co., featuring the automatic control of steel webs at 1,000 fpm; Ford Motor Co., automatic control of the manufacture of Ford engines, and Standard Oil Co., automatic control as applied to the oil industry. At the same time, motion pictures will be shown at the hotel meeting rooms. These will be "Principles of Automatic Control" (a project of the Instrument Society of America) and "Motors in Industry" (General Electric Co.).

APPA Research Committee Meeting Announced

The annual Technical Conference sponsored jointly by the APPA Committee on Coordination of Research and the U. S. Forest Products Laboratory will be held June 2 at the Laboratory in Madison, Wis. The program, which is to begin at 9:30 a.m., will be confined to the work of the Forest Products Laboratory and will be entirely prepared and presented by the staff. Those planning to attend have been requested to contact G. H. Chidester, chief of the division of pulp and paper at the Laboratory.

Supts. Move to Larger Quarters

The American Pulp & Paper Mill Superintendents Association recently moved its national headquarters office in Chicago from 111 West Washington St. to 327 South LaSalle St. The change was prompted by the need for larger quarters. According to the official announcement, "the growth of the Association during the past few years made the additional space necessary."

Packaging Institute Changes Meeting Dates

The Packaging Institute has announced a change in the date of the Fifteenth Annual Forum, which is now to be held October 12-14 at the Hotel Statler, New York, N.Y.

According to Robert deS. Couch of General Foods Corp., president of the Institute, the change was made in order to avoid conflict with the annual convention of the Packaging Association of Canada at Toronto and that of the Society of Industrial Packaging and Materials Handling Engineers in Boston.

Southern Supts. Name Fensom

Tom S. Coldewey of St. Joe Paper Co., Port St. Joe, Fla., has announced the appointment of Paul S. Fensom as secretary-treasurer of the Southern Divi-

sion of the Superintendents Association. Mr. Coldewey is chairman of the division and an associate of Mr. Fensom at Port St. Joe. At the present time, Mr. Fensom is project coordinator of the firm's expansion program.

Closing Date of Bolton Award Contest Extended

John W. Bolton & Sons Inc. of Lawrence, Mass., has announced its decision to extend the closing date of the Sixth Bolton Award Contest from March 31 to April 30. The subject of the 1953 competition is "The Obligations of a Company to its Employees;" all employees of North American paper mills are eligible.

All entries should be mailed to the secretary-treasurer of the American Pulp & Paper Mill Superintendents Association, 327 South LaSalle St., Chicago 4.

Coming Events

TAPPI meetings

May 21-22—Lake Erie Section, spring meeting, Hotel Carter, Cleveland.

May 22-23—Pacific Section, joint meeting with the Pacific Coast Division of the Superintendents Association, Gearhart Hotel, Gearhart, Ore.

May 25-27—Fourth Coating Conference, Netherlands Plaza Hotel, Cincinnati.

American Pulp & Paper Mill Superintendents Association meetings

April 23—Miami Valley Division, American Legion Hall, Middletown, Ohio.

May 8-9—Northwestern Division, Dell View Hotel, Lake Delton, Wis.

May 15-16—Pennsylvania-New Jersey-Delaware Division, Hotel Stacy-Trent, Trenton, N. J.

May 21—Michigan Division, Hotel Harris, Kalamazoo.

May 22-23—Pacific Coast Division, joint meeting with the Pacific Section of Tappi, Gearhart Hotel, Gearhart, Ore.

June 5—Miami Valley Division, Orr Felt & Blanket Co., Piqua, Ohio.

June 9-11—National meeting, Atlanta-Biltmore Hotel, Atlanta.

Other meetings

April 26-29—American Institute of Chemical Engineers, joint meeting with the Chemical Engineering Division of the Chemical Institute of Canada, Royal York Hotel, Toronto.

May 18-20—National Paperboard Association, spring meeting, Santa Barbara Biltmore Hotel, Santa Barbara, Cal.

June 2—Technical Conference of APPA Committee on Coordination of Research, sponsored jointly by the U. S. Forest Products Laboratory, Madison.

10
NASH VACUUM PUMPS
are simple
One moving part. No valves, no pistons, no timing gears, no internal lubrication. This makes possible important operating advantages no other type pump offers.
Plus-
NASH ENGINEERING COMPANY
414 WILSON AVE., SO. NORWALK, CONN

The Paper Industry Names in the News

Natwick Named Resident Manager at New Texas Mill

A. G. NATWICK has retired as assistant resident manager of the Camas, Wash., mill of Crown Zellerbach Corp. He will assume duties as resident manager of the new bleached kraft paper mill being built at Evadale, Texas, by East Texas Pulp & Paper Co. The mill is a joint project of Time Inc. and Houston Oil Co. and is to have a daily capacity of 250 tons. Raw material will be southern pine.

A veteran of 23 years' service with C-Z, "Buff" Natwick began his career at Lincoln Pulp & Paper Co. in Merritton, Ont. He joined C-Z at Camas in 1929 as technical director. In 1934 he was promoted to assistant resident manager under J. E. Hanny. Mr. Natwick was instrumental in establishing the Paper School at Camas in 1933. The school, now known as the Crown Zellerbach Paper School, has gained recognition from the University of Washington and Oregon State College.

For the past year Mr. Natwick has been on leave of absence from C-Z to serve as director of the Forest Products Division of NPA. He was in charge of all matters relating to printing and publishing, lumber and wood products, and pulp, paper and paperboard. He resigned the assignment in mid-February.

A. G. Natwick

R. M. Heath

RUSSELL M. HEATH has been named manager of pulp sales for Scott Paper Co.'s Soundview Division. Formerly manager of the pulp and paper plant at the Scott subsidiary in Marinette, Wis., he will make his headquarters in Chester, Pa.

WILLIAM R. BOWEN, pulp mill engineer at Marinette Paper Co., has been promoted to the position of general mill engineer at the Chester, Pa., plant of Scott Paper Co. He was first employed at Chester in 1947 and later was transferred to Marinette as maintenance engineer. In 1952 he was named pulp mill engineer. Mr. Bowen will be succeeded by *DONALD RUNNOE*, project engineer.

Two Named to Western Michigan Advisory Group

Two new members have been named to the advisory committee of the paper technology curriculum at Western Michigan College in Kalamazoo. *BERT H. COOPER*, vice president of Kalamazoo Paper Co., and *E. E. LUDWIG*, vice president of Bermingham-Prosser Co., have been appointed to replace Maxwell Bardeen, president of Lee Paper Co. of Vicksburg, and F. C. Curtenius, treasurer of Kalamazoo Paper.

H. H. Harrison

Stanley H. Reed

The board of directors of Crystal Tissue Co., Middletown, Ohio, has announced the reappointment of *HOWARD H. HARRISON* as vice president in charge of manufacturing and of *STANLEY H. REED* as vice president in charge of sales. All officers of the firm and members of the board were reelected.

J. & J. Rogers Staff Changes

J. & J. Rogers Co. of Au Sable Forks, N.Y., has announced the advancement of *JOHN R. ROGERS* to the position of assistant manager and purchasing agent. *THOMAS PARKHILL* and *RALPH PRINCE* have been added to the staff, the former as paper mill superintendent and the latter as technical superintendent.

Mr. Rogers has been with J. & J. Rogers since 1929, starting as assistant superintendent in the sulfite mill. In 1931 he became superintendent. In 1944 he was made assistant superintendent at the paper mill and in 1947 superintendent, which job he has held ever since.

Mr. Parkhill had 27 years experience with Strathmore Paper Co., which he left to go into business for himself. For two years before joining J. & J. Rogers he was manager of Monadnock Paper Mills Inc. at Bennington, N.H. Mr. Prince, a graduate of the University of Maine, was associated for 10 years with Fort Orange Paper Co. at Castleton, N.Y., where he served as a chemist. He left Fort Orange to engage in industrial research work at the University of New Hampshire, after which he did sales-service work for American Cyanamid Co. in New York State. For the last five years he has been secretary-treasurer of the Empire State Section of Tappi.

JOHN G. STRANGE of Appleton, Wis., vice president and treasurer of the Institute of Paper Chemistry and president of John Strange Paper Co. of Menasha, has been elected to the board of directors of Cutler-Hammer Inc.

J. LYNNE FERNER, manager of the Tyrone and Williamsburg, Pa., plants of West Virginia Pulp & Paper Co., has been elected president of the Tyrone borough school district authority.

James Spencer

Joseph Thompson

Minerva Wax Promotes Two

Minerva Wax Paper Co., Minerva, Ohio, has announced the promotions of *JAMES SPENCER* and *JOSEPH THOMPSON*. Mr. Spencer becomes assistant to the president, while Mr. Johnson takes over the post of vice president in charge of research and development.

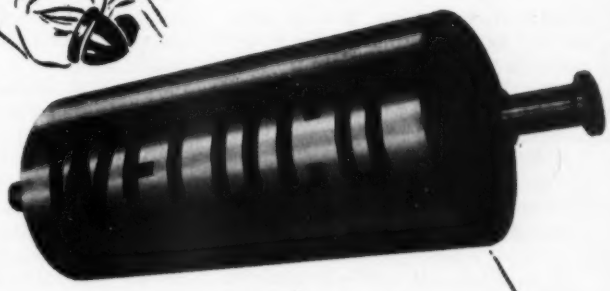
Before joining Minerva in 1947, Mr. Thompson did research work for Dennison Mfg. Co., Framingham, Mass.; Bat-

For CORROSION-RESISTANT ROLL COVERS

WELDCO ALWAYS GETS FIRST CALL!

Both new and old rolls, covered by the patented Weldco "Pressure Welding" process, resist corrosion, withstand abrasion, and give long, economical service with a minimum of maintenance. That's why so many Weldco rolls are used in pulp and paper, textile, food, and chemical plants from coast to coast. The Weldco process, using Monel, Stainless Steel, Nickel, Inconel, and other alloys, can be applied to new or reclaimed rolls, eliminating the cost of new cores and providing substantial operating economies.

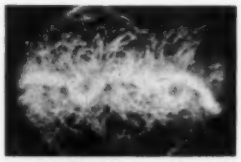
Investigate this patented process that's not an electroplate ... not a sprayed coating... but a solid layer of rolled metal, applied to the base roll uniformly and tightly. Let Weldco's roll specialists advise you on the best materials for your roll and processing requirements.



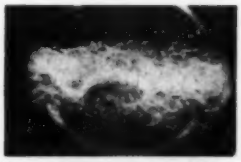
Other WELDCO Products include: Chains, Hooks, Mechanical Picklers, and Light Wall Alloy Tubing.

THE YOUNGSTOWN WELDING & ENGINEERING COMPANY

3700 OAKWOOD AVENUE . . . . YOUNGSTOWN 9, OHIO

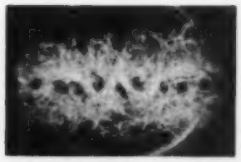


1a Untreated. Unused.



b Untreated after one week's use.

2a Orr-Chem unused.



b Orr-Chem after one week's use.

ORR-CHEM FELTS RETAIN THEIR "CUSHION"

Fig. 1a. A conventional felt when new. Fibers open and loose, hence good drainage.

Fig. 1b. Same felt after use. Fibers considerably matted, hence impaired drainage.

Fig. 2a. An Orr-Chem when new. Drainage qualities satisfactory.

Fig. 2b. Same felt after use. Felt still open and loose, if anything more so than when brand new.

There in pictures is the Orr-Chem porosity story —evidence that the Orr chemical treatment of felts largely controls the thickness, definitely retards the tendency to compress, mat and lose porosity.

Translated into extra days on the machine and additional tonnage produced, the evidence multiplies that Orr-Chem felts are "the buy"—considerably less costly in the long run than conventional untreated felts.

Does your production chart graph a sagging line as the felt gradually becomes compressed in thickness?

Orr

Orr-Chem chemically treated felts
An-Bac anti-bacterial felts
Standard untreated felts

THE ORR FELT & BLANKET CO.
PIQUA, OHIO

telle Memorial Institute, Columbus, Ohio, and Dewey & Almy Chemical Corp., Cambridge, Mass. Mr. Spencer has been with the firm since 1947 and has been a director since 1950. Previous to his promotion, he was sales coordinator.

CHARLES H. SAGE, vice president of Kimberly-Clark Corp., Neenah, Wis., has been named chairman of the Forest Industries Council. FIC covers the major forestry and woodland industrial organizations in the United States.

JOHN D. FENNEBRESQUE, vice president and assistant to the president, has been elected to the board of Celanese Corp. of America.

WALTER G. HUGHES, head of the working plans division of the British Columbia Forest Service, has been elected president of the Association of B. C. Registered Foresters. *KEN C. McCANNEL* of C. D. Schultz & Co. Ltd., Vancouver, was named vice president. New members of the council include: *IAN T. CAMERON,* assistant district forester, Vancouver; *W. STANLEY HEPHER,* forester for Alaska Pine & Cellulose Ltd., and *ROBERT C. ST. CLAIR,* consulting forester of North Vancouver. *PROF. F. M. KNAPP,* a member of the faculty of forestry of the University of British Columbia, was elected registrar.

F. R. BOYNTON, secretary-treasurer of Provincial Paper Ltd., Toronto, and *ROBERT A. MILLER,* controller of Kalamazoo Vegetable Parchment Co., have been elected to membership in the Controllers Institute of New York, N.Y.

ELI WHITNEY DEBEVOISE, New York, N.Y., attorney and former assistant United States high commissioner in Germany, has been elected a director of West Virginia Pulp & Paper Co.

EDWARD L. DeMOTTE, former Gulf States district manager for American Forest Products Industries, has succeeded *C. EDWARD STOUT* as southeastern district manager, with headquarters at Atlanta. Mr. Stout is being transferred to the Washington, D.C., headquarters as administrative assistant. Mr. DeMotte, former co-publisher and associate editor of the *Alabama Lumberman,* will cover Georgia, Florida and Alabama.

Hammermill Paper Co. of Erie, Pa., has appointed *SAM STEFF* and *DANIEL S. RANCKA* as relief foremen in the transportation department. *HILDING ELMGREN, GEORGE LEWIS, KARL VOGEL* and *WILLIAM BYRON* have been named assistant foremen in the pulp mill.

Canadian Chemical & Cellulose Co. Ltd. has named *LOUIS A. LEPOINTE* as secretary and *ROBINSON ORD* as vice president. Mr. Lepointe was formerly director of departments for the City of Montreal.

HOWARD JOHNSON, who has been associated with International Paper Co. at Sheridan, Ark., for the past four years, was recently transferred to Mississippi, where he is district forester for the Carthage District of International. He will have charge of more than 80,000 acres of timber.

CHARLES U. HARVEY, formerly with Hinde & Dauch Paper Co., has formed a new firm, Harvey Container Corp., now in production in a new plant at Plymouth, Mich. The company manufactures packing and shipping containers.

J. D. ZELLERBACH, president and director of Crown Zellerbach Corp., has been elected a director of California Packing Corp. Mr. Zellerbach is also chairman of the board and a director of Fibreboard Products Inc. and a director and member of the executive committee of Rayonier Inc.

J. D. Zellerbach

F. Herbolzheimer, Jr.

FRED HERBOLZHEIMER JR., technical director of Scott Paper Co. at Marinette, Wis., has been named chairman of the 1954 University of Maine Pulp and Paper Alumni luncheon in New York, N.Y. He graduated from the school in 1943 with a B.S. degree in pulp and paper technology and received his M.S. from Maine in 1948.

WILLIAM F. WESTER has been appointed director of public relations for Hinde & Dauch Paper Co., Sandusky, Ohio.

WILLIAM H. HARDING, director of research for National Gypsum Co., Buffalo, N.Y., has been appointed to an eight-man editorial advisory board for publications of the American Chemical Society.

ROY V. WELDON, vice president in charge of engineering and research since 1950, has been elected a director of Great Northern Paper Co. Also elected was *E. SPENCER MILLER,* president of Maine Central Railroad Co. and director of the National Bank of Commerce, Portland, Maine.

WILLARD H. MOON, formerly with Superfine Paper Mills of Clayville, N.Y., has recently been made general superintendent of National Paper Corp. of Pennsylvania, Ransom, Pa.

SAMUEL J. QUATTROCCHI has been appointed general superintendent of Glassine Paper Co. *FRANK POTTER* is the newly named general manager.

Dr. George Borden, technical director of Riegel Paper Corp., has announced that *DICK FLORES* has transferred from research at Milford, N.J., to chemical control work on production at the three Upper Mills, and that *DICK LEWIS* and *GENE McNALLY* are recent additions to the Milford research staff.

EDWARD T. WALTER, a founder of Wilcox-Walter Furlong Paper Co. at Philadelphia, has retired after 31 years as treasurer. He remains in an advisory capacity. Appointed to succeed Mr. Walter was *IRA H. DERCK.*

Chase Bag Co. has announced two top executive changes. *ROBERT N. CONNORS,* vice president and general sales manager and a member of the board of directors, was named executive vice president. *WILLIAM N. BROCK,* assistant general sales manager, was made general sales manager.

JOHN B. SCHIEBLER, supervisor of the manpower division of the Industrial Relations Department of Kimberly-Clark Corp., Neenah, Wis., has been named personnel superintendent of the firm's Niagara Falls plant.

MILTON OSTERMAN, 54-year-old truck driver for the National Pole & Treating Division of Minnesota & Ontario Paper Co., has completed his 28th year without an accident. Mr. Osterman, who lives in Minneapolis, has worn out six trucks, driving more than 1,000,000 miles.

J. D. YOUNG has been elected president of Edgewater Paper Co., Menasha, Wis.

DR. GORDON I. HOOVER has been appointed manager of the Thorold mill of Provincial Paper Ltd., Toronto, Ont. He will continue his duties as technical supervisor of the company, but will relinquish the management of the company's coating mill at Georgetown, Ont. *D. R. DUNCAN* becomes general

superintendent of the Georgetown mill. Joining the company in 1930 as research director, Dr. Hoover was on loan during the war to the Allied War Supplies Corp. and returned to Provincial Paper in 1946 as technical director. The following year he was made assistant director of development and control, and in 1950 he was appointed company technical supervisor and Georgetown mill manager.

DWIGHT L. STOCKER, president of Kalamazoo Vegetable Parchment Co., has been named chairman of the board of Appleford Paper Products Ltd., Hamilton, Ont. *E. NORVAL HUNTER,* KVP vice president in charge of Canadian operations, was chosen president.

Gardner Board & Carton Co., Middletown, Ohio, has announced the following appointments: *FLOYD W. LOCKARD,* controller, has also been named assistant to the vice president of finance; *DAVID R. ARNOLD,* director of management planning, has been promoted to assistant controller; and *CHARLES S. SWEITZER* has been promoted to the position of chemist. Mr. Lockard joined the company in 1925 as a cost clerk in the accounting department; Mr. Arnold became associated with Gardner in 1950 as internal auditor, and Mr. Sweitzer joined Gardner in 1952 as a trainee.

GEORGE FALK has been promoted to shift supervisor for Marinette Paper Co. He entered the plant in 1943 as fourth hand and progressed to machine tender.

JOHN J. GRIEB, a member of the St. Regis Paper Co. engineering staff at Carthage, N. Y., since 1941, retired effective February 1.

NORT BASER, a former Michigan newspaperman, has been named Midwest manager for American Forest Products Industries Inc. He was at one time managing editor of *American Forests Magazine.* Mr. Baser takes over the AFPI office in Chicago, which is headquarters for Illinois, Iowa and Nebraska. This is part of a larger Lake States territory formerly managed by *JOHN R. CALKINS,* who will establish a new office at Green Bay to serve Wisconsin, Minnesota, upper Michigan, North and South Dakota.

ROY DYGERT has been promoted to the newly created position of market research analyst for National Gypsum Co. Formerly construction consultant in the Buffalo District sales department, he has also served in the research department.

The Paper Industry Necrology

William A. Wheeler

William A. Wheeler, 83, retired president of A. P. W. Products Co. Inc., died March 10 in the Ten Eyck Hotel, Albany, N.Y., where he made his home. He entered the paper industry in 1887 and was treasurer until the death of his father, at which time he became president. He held the position until his retirement in 1930. A former president of the old Albany County Savings Bank, Mr. Wheeler was a director of National Commercial Bank & Trust Co. from 1924 to 1948. He was a member of the Fort Orange Club and the Albany Country Club.

Dr. Paul Schlosser

Dr. Paul Schlosser, 59, research manager for Rayonier Inc., died March 12 in New York, N.Y. Dr. Schlosser joined the firm's research division in Shelton, Wash., in 1935. He had long been identified with the field of cellulose chemistry and rayon and had made important contributions to the succesful development of wood cellulose as a basic chemical raw material. Dr. Schlosser studied under Prof. Emil Heuser at Darmstadt, Germany, before coming to this country. Subsequently, he worked with Glanzstoff in Germany and Woonsocket Rayon Co.

John J. O'Connor

John J. O'Connor, until his retirement two years ago superintendent of Mohawk Paper Mills Inc. in Cohoes, N.Y., died February 14 at his Cohoes home. He was 86. Long identified with executive positions in the paper industry in the United States and Canada, he was at one time secretary-treasurer of the Paper Makers' Union at Watertown. Firms with which he had been associated include Babbitt Paper Co., Bellows Falls, Vt.; Don Valley Paper Co., Toronto; Howard Smith Paper Mills Ltd., Beau Harnois, Que., and International Paper Co., Niagara Falls.

C. R. McMillen

C. R. McMillen, consultant to Union Bag & Paper Co. and former president of that firm, died in February at South Orange, N.J. He was 73.

Mr. McMillen left Union Bag & Paper in 1931 to become executive vice president of St. Regis Paper Co. After seven years with St. Regis he joined Camp Mfg. Co. of Virginia, retiring in 1949 to return to Union Bag & Paper in an advisory capacity.

F. A. Sillman

Frank A. Sillman, secretary-treasurer of Marinette & Menominee Paper Co. until that firm was purchased by Continental Paper & Bag Corp. in 1917, died at his home in Menominee, Mich., recently. He was 90. Mr. Sillman joined Marinette & Menominee in 1884. He was purchasing agent for Continental until his retirement in 1930 after more than 45 years in the industry.

Henry J. Sandblade, consulting engineer and vice president of Thomas Flexible Coupling Co. of Warren, Pa., died recently.

William A. Fannon, 89, died recently in Appleton, Wis. He was the founder of Fannon Trading Co., a paper industry equipment firm, and president of Yankee Paper & Specialty Co. of Menasha.

H. W. Weiss, 62, founder and president of Canada Glazed Papers Ltd., died in January in Toronto. He was former general sales manager for Harvey Woods Ltd.

Winfield S. Edge, general plant manager of the Folding Carton Division of Container Corp. of America, died recently in Philadelphia. He was 32.

Robert Johnston Jr., 66, for the past 30 years president of General Paper Stock Co. of St. Louis, died March 5. He had been associated with the firm since its founding in 1907 and had long been prominent in the waste paper industry. Mr. Johnston served for many years as secretary of the Waste Paper Bureau and was a member of the Study Committee on Waste Paper Standards and Practices, which wrote the simplified standards published by the National Association of Waste Material Dealers.

Jacob E. Edelstein, 59, vice president and general manager of Rapinwax Paper Co. of Minneapolis, died February 28. He became associated with the firm in 1926 and had held the vice presidency for 25 years.

The Paper Industry Safety News

Rayonier and Longview Fibre Win Trophies in West Coast Competition

ANNUAL AWARDS were won by Rayonier Inc., Hoquiam, Wash., and Longview Fibre Co. at Longview during the Seventh Annual Labor-Management Safety Conference held in Tacoma March 12-13. The state meeting was jointly sponsored by the Pacific Coast Association of Pulp & Paper Manufacturers, the International Brotherhood of Pulp, Sulphite and Paper Mill Workers, and the International Brotherhood of Paper Makers.

Rayonier was given the Governor's Trophy, established by Gov. Arthur B. Langlie, for the best frequency rate during 1952. Hoquiam had a record of 3.53 accidents per 1,000,000 man-hours worked. The trophy was presented by Fred Koch, executive assistant to the governor.

The Longview plant had the best record over the immediate past five years, with a frequency of 3.28 accidents per 1,000,000 man-hours for that period. Presentation was made by Al E. Brown, vice president of the Paper Makers.

Greater cooperation

The 223 labor and management representatives of the state's pulp and paper industry were greeted by John Teevin of the International Brotherhood of Paper Makers. In an address at the general meeting, H. W. Morgan, manager of the Pulp Division of Weyerhaeuser Timber Co., declared that the group's joint safety program was continuing to produce results and that both labor and management are profiting from the combined effort. He stressed, however, the fact that there can be no resting on the laurels gained to date, and that even greater cooperation would be needed to maintain and improve the enviable low accident rate achieved by the industry.

Keynoter of the Conference was A. H. Zeilinger, superintendent of safety for Colorado Fuel & Iron Corp., Pueblo, who pointed out that in his opinion "safety has done more to harmonize labor-management relations than any other activity in the industrial field. The steel industry was one of the most hazardous in the world until labor and management did something about it."

Women in Industry

The 1953 Conference found women workers taking a more active part than heretofore. A panel on "Feminine Viewpoints on Safety" proved to be one of the highlights. Women workers from Everett, Hoquiam and Camas discussed the subjects, "Safety Attitudes at Home," "Problems of the Working Wife," "Indoctrination of Working Women" and "How to Handle Women."

The program of joint safety conferences was inaugurated in 1946 by the Pacific Coast Association of Pulp and Paper Manufacturers and the two unions in an effort to improve the accident experience of the 36 association member mills in Oregon, Washington and California. Management and labor officials report that the Conference has been an important factor in the 80 per cent decrease in work accidents that has taken place in Pacific Coast mills since that date.

General chairman of the Tacoma meeting was Jack F. Robertson of Crown Zellerbach Corp. at Camas. Conference co-chairmen presiding over the discussions were John Sherman of Tacoma, vice president of the Pulp, Sulphite Workers, and R. M. Gilmore, general safety supervisor for Rayonier Inc. at Hoquiam.

St. Regis Reviews Successful Year in Safe Operation

St. Regis Paper Co.'s safety program has resulted in nine awards to company mills and plants by the Pulp and Paper Section of the National Safety Council for 1952. Awards were also made to several of the St. Regis plants by industrial safety groups.

1. The Kalamazoo printing paper mill won the NSC's Award of Honor for having operated a total of 1,009,116 man-hours without a disability injury during 1952. The mill also received the Safety Council's Certificate of Achievement for reduction of accident frequency rates and a certificate from the Greater Kalamazoo Safety Council.

2. The Vancouver, B.C., multiwall bag plant won the NSC's Certificate of Commendation for going through 1952 without a disabling injury. In addition, the plant won first place in Group 1, Division 2 of the Council for reduction of accident frequency rates. It also received the Canadian Provincial Compensation Department safety award and the Canadian Pulp and Paper Group award. For its safety achievements, the Vancouver plant won the company-wide St. Regis award and plaque.

3. NSC certificates for reduction of accident frequency rates were awarded to the following other St. Regis plants: the Watertown, N.Y., paper mill, and the multiwall bag plants at Tacoma, Wash.; Los Angeles; Three Rivers, Que., and Franklin, Va.

4. The Panelyte Division's Kalamazoo plant received the NSC's Certificate of Achievement for having completed one full year without a disabling injury. The unit also was awarded a certificate from the Greater Kalamazoo Safety Council.

5. The Ponce, Puerto Rico, multiwall bag plant achieved a 100 per cent decrease in accident frequency rate and had no disabling injuries in 1952. It placed first in the Council's Group 1, Division 2 and was awarded a company safety plaque.

Ernest B. Lambton, safety engineer for St. Regis, pointed out that St. Regis safety plaques were also awarded to several other units of the company in recognition of their safety records. These plaques are awarded annually within the various St. Regis divisions.

The Watertown mill received the company safety plaque for the Kraft Division. In addition, the mill has been selected to receive the first place safety award of the Associated Industries of New York in its annual competition.

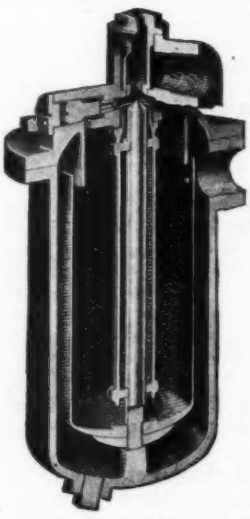
Southern Meeting Scheduled for May

The Southern Pulp & Paper Safety Association is scheduled to meet May 4-6 at the King and Prince Hotel on St. Simons Island, Ga., according to an announcement by W. B. Ballinger of Brunswick Pulp & Paper Co., who is chairman.

The program includes a visual session at which slide films will be shown of unusual accidents occurring in member mills of the Association. Discussion will be by representatives of plants exhibiting the slides. A panel discussion on various aspects of departmental safety will feature several men who are prominent in the safety field at plants in the southeast.

Entertainment includes an outing with Brunswick Pulp & Paper as host and a tour of the Bruswick plant, banquet and dance. It is expected that some 125 members of the safety association will be in attendance. Chairman Ballinger and A. H. Owens are in charge.

A Stickle Trap on every dryer earns EXTRA MONEY for you!

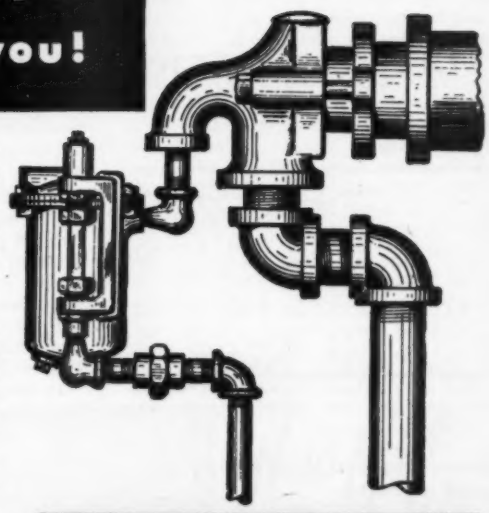


When machines operate at drying pressures of less than five pounds, or on vacuum, *individual* trapping of dryers is your best assurance of proper, profitable drainage. A Stickle Trap on every dryer will discharge air and condensation quickly and economically—save fuel, save steam, *save money!*

Stickle Open Float Traps are engineered for economy. By-pass for air is built right in. Self-regrinding valve prevents wire drawing. Users report Stickle Traps have worked 'round the clock for 20 years *without a penny for maintenance.*

To assure you of the right trap for your particular requirements, Stickle makes 60 types and sizes—in capacities ranging from 250 to 46,000 lbs. per hour. And there's a GUARANTEED 60-DAY PROVING PERIOD for every installation—you must be satisfied!

Write or phone for full information on money-saving Stickle Traps. Ask for *free* illustrated catalog No. 160.



Stickle Equipment
Cuts the cost of steam

STICKLE STEAM SPECIALTIES COMPANY
2215 VALLEY AVE. INDIANAPOLIS 18, INDIANA

Kalamazoo GLAZED TILE TANKS AND CHESTS...

Engineered to your needs ... any size or shape ... impervious to corrosion ... keep contents clean ... reduce friction of flowing liquids ... easiest to clean ... last for years and years.
SEND FOR COMPLETE DETAILS

Kalamazoo TANK and SILO CO.
TILE TANK DIVISION
427 HARRISON STREET ... KALAMAZOO, MICHIGAN

FREE GUIDE
to proper
SPRAY NOZZLE selection

Whatever the application ... chemical spraying, evaporative cooling, web spraying, washing, cleaning ... you will find this new 40-page catalog of nozzle information helpful. Data includes nozzle dimensions, capacities, illustrations ... in short, everything you need. And it's FREE! Just contact: Binks Manufacturing Company, 3118-32 Carroll Ave., Chicago 12, Ill.

Binks Manufacturing Company
3118-32 Carroll Ave., Chicago 12, Ill.
O. K. BINKS. Send me your Spray Nozzle Catalog ... FREE!
NAME
ORGANIZATION
ADDRESS
CITY ZONE STATE

Binks
A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS

Foreign Abstracts . . . . . .

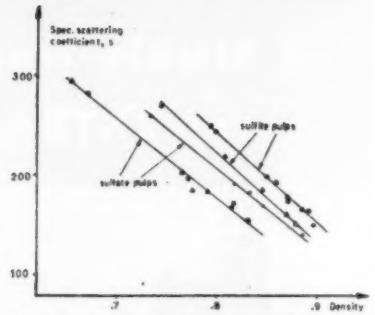
Chlorine added %	Lignin content %	Brightness % GE	Spec. scatt. coefficient 560 mμ	Spec. absorption coefficient 410 mμ	Spec. absorption coefficient 560 mμ	Tappi Opacity
0	1.96	57.9	275	25.7	8.4	0.59
0.4	1.95	52.8	286	41.1	9.4	0.60
0.8	1.83	54.2	285	37.0	7.2	0.60
1.2	1.51	57.8	290	37.9	5.7	0.52
2.0	0.82	67.7	288	22.0	2.5	0.49
2.8	0.50	72.9	292	15.0	1.9	0.48
4.4	—	81.4	295	5.6	1.2	0.55

Effect of hypochlorite bleaching on the optical properties of a sulfite pulp, according to Forni

Bleaching and its influence on pulp opacity

Due to the removal of lignin and some hemicelluloses during bleaching operations, light-scattering "hollow spaces" are formed in the cell wall. Thus, the light-scattering coefficient may increase somewhat, as indicated in the accompanying table (cf. Forni, *Tech. Assoc. Papers*, **28,** 399 [1945]). Due to increase in brightness, however, the opacity of the paper (measured as printing opacity or contrast ratio) decreases during bleaching. The oxidation of hydroxyl groups which may occur in cellulose or the hemicelluloses during a bleaching operation, with concomitant increase in carboxyl groups and a change (normally a decrease) in refractive index, does not appear to influence the light scattering properties of the pulp. Apparently such different bleaching agents as chlorine, hypochlorite and chlorine dioxide show markedly similar effects.

If, however, the fiber structure is weakened during bleaching, the pulp sheet becomes denser and hence less opaque. This effect is especially noticeable after beating and when high pressures are used during wet-pressing. Pulps bleached with chlorine dioxide may, therefore, be more opaque than those bleached (as ordinarily) with hypochlorite. The accompanying figure shows the relationship between specific scattering coefficient and paper density of pulps bleached in different ways, beaten in a Valley beater and sheets formed by the Swedish method. [Here the symbols in terms of bleaching operations are the following: *circle*=chlorine-alkaline wash-hypochlorite-alkaline wash-hypochlorite; *square*=same



The relationship between the specific scattering coefficient and the paper density for pulps bleached in different ways

except that final stage is a chlorine dioxide bleach; *triangle*=chlorine dioxide-alkaline wash-chlorine dioxide-alkaline wash-chlorine dioxide. The *solid black circles, squares,* and *triangles* have similar connotations, excepting that in each case the two final bleaching stages are repeated, thus involving *seven* instead of five steps.] Hans W. Giertz. *Svensk Papperstidn.*, **55,** 897-900 (1952). (In Swedish, with English and German summaries.)

Influence of chemical composition and fiber morphology on pulp properties

Papermaking properties of mechanical pulps depend on the size and shape of the units and not so much on the chemical composition of the pulps, although the grinding process is affected by wood composition. In the case of sulfate pulps, the papermaking properties are contingent both on chemical composition (as affected by the degree of cooking) and on the morphology.

This morphological effect is shown in the differences between Scandinavian (or American, Northern) kraft on the one hand, and kraft formed from southern pines, Douglas fir, or western hemlock on the other. The former gives soft flexible fibers, whereas the latter is chunky. The former is the more desirable for printing and wrapping paper in which high tensile and high bursting strength are required. The latter is satisfactory for coarse wrappings and boards, and for papers with adequate tear resistance, lightness, porosity and bulk. At times, blends of the two types of fibers give the best results. L. G. Cottrall. *Worlds Paper Trade Review,* **138,** No. 23, 1777-80, 1782, 1784 (1952); *Paper-Maker* (London), **125,** No. 1, 34-6, 38 (1953).

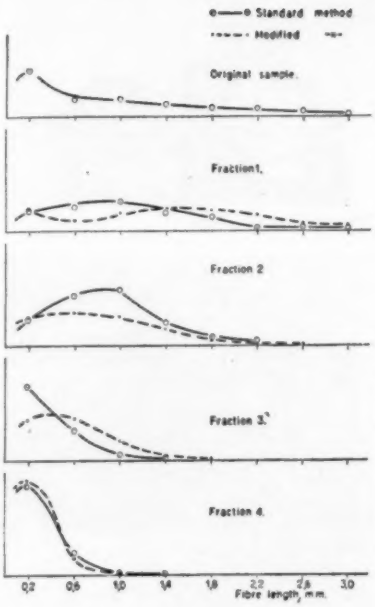
Banana stumps used in pulping

The Handmade Paper Research Center, of India, established at Poona, Bombay State, reports that an excellent grade of kraft paper can be made from a mixed furnish consisting of 40 per cent jute and 60 per cent banana stumps. Transportation, however, is uneconomical for large scale industrial production; but the wet stumps can be used as raw materials in local cottage industries. Anon. *Foreign Commerce Weekly,* **48,** No. 19, 15 (1952). Through *Bull. Inst. Paper Chem.*, **23,** 233.

Look to the Source!

WHEN YOU USE SODIUM CHLORATE FROM OLDBURY . . . you may rely upon the reputation of your source of supply as absolute assurance of the product *quality* and *uniformity* that you must have to maintain and advance your own product standards and customer services.

OLDBURY
ELECTRO-CHEMICAL COMPANY
Plant and Main Office:
NIAGARA FALLS, NEW YORK
New York Office:
19 RECTOR STREET, NEW YORK 6, N.Y.



Swedish study and modification of the Clark fiber classifier

Clark's method, carried out in his classifier, is compared with a modified procedure carried out in a somewhat modified apparatus designed in the Central Laboratory of the Swedish Paper Mills. These differences are described in some detail. The main object of the modified equipment and technique is to insure (if possible) greater reproducibility, using an unbleached sulfite pulp (unbeaten, and beaten under a series of standardized conditions). Apparently the modification achieved improved reproducibility and more consistent results (although admittedly far from any ideal classification).

All fractions contain fibers of all lengths (excepting the very finest). Frequency distribution diagrams of fiber lengths according to number are drawn, both for the original ("standard") procedure and for the Swedish ("modified") procedure. The results for the *unbeaten* pulp are shown in the accompanying figure. (Similar graphs are drawn for pulps beaten at 1000, 2000, and 3000 revolutions in a P.F.I. beater).

The possibility of introducing a "classification factor" characterizing each wire is discussed. This is defined as the ratio of relative weight to relative frequency. Computation indicates that such factors, however, are different for different states of beating (no systematic variations could be established). Seven tables are given. Olle Andersson. *Svensk Papperstidn.*, **55**, 927-932 (1952). (In English.)

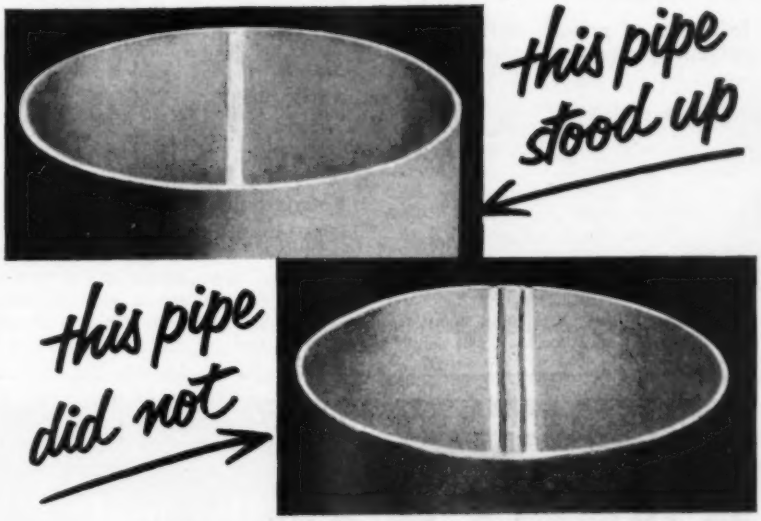
Fire hazards in hot processing of fiberboards

The factors that may result in self-heating of fiberboards during drying and hot processing are discussed. Oil impregnation followed by heat processing is included. The treatment is carried out in drying chambers or continuous tunnel driers through which the boards travel in such a manner that an air current can be directed over either side of the board.

The more common hazards include: uneven distribution of the cooling air or insufficient rate of air flow, uneven moisture distribution in the board; "forced" drying; unsatisfactory cooling installations; changes in board furnish; static electricity; sparks generated by friction, *et al.*

The following means for reducing fire risks are listed: (1) an adequate turbulent air flow over the plates should be obtained; (2) suitable fans for *directing* air currents should be installed; (3) heating surfaces must be kept free of dirt (i.e., with flat faces and smooth flanges, so that dirt accumulation is obviated); (4) automatic temperature recordings and controls are essential; (5) automatic water cooling in the final processing stage is required; (6) metal sections of the drier must be properly grounded; (7) spark-forming parts must be absent from blower fans. Furthermore, constant supervision is highly necessary. Inasmuch as some substances expelled from boards during the treatment can form explosive mixtures with circulating air, safety valves should be installed so as to prevent the building up of dangerous pressures. All sections of a drier should be readily accessible, so that ignited material can be easily removed. Fire alarms are essential, and fires should be fought with carbon dioxide (*not* steam). A. Hägglund. *Svensk Papperstidn.*, 55, 879-84 (1952); through *Bull. Inst. Paper Chem.*, 23, 392 (1953). (Original in Swedish.)

After a 32-hour acid test...



It pays to specify SWEPCO Annealed Machine Welded Pipe

In a recent test, two pieces of 6" O.D. stainless steel welded pipe, Type 316, were placed in a solution of 3% hydrofloric and 10% nitric acid. One was annealed—the other was not.

After 32 hours, the unannealed pipe (at bottom) was corroded on each side of the weld heat zone, where carbide precipitation had taken place during welding. This pipe was rendered useless.

The annealed piece, however, was sound as ever. Annealing having eliminated carbide precipitation, no corrosion set in.

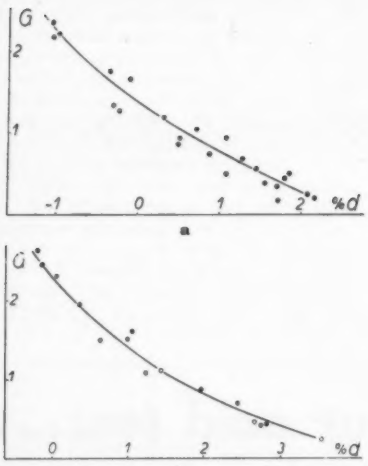
For long service and best results, specify Swepco machine welded pipe—annealed, pickled and passivated. If contamination only is your problem, ask for Swepco select or mill grade.

Swepco pipe, tubing and welding fittings, 3" to 18" I.P.S., are obtainable in *stainless steel, nickel alloys, Carpenter "20," Hastelloy alloy, and other metals.* Material is available for FAST DELIVERY and can be furnished in long lengths.

Lick the corrosion problem in your plant by writing today for complete illustrated information.

STAINLESS WELDED PRODUCTS, INC.

253 Cornelison Avenue
Jersey City 2, N. J.
Tel.: HEnderson 5-0123
Distributors in principal cities.
Export Dept.: Box 350, Port Washington, N.Y.



Stiffness of papers with softening agents

There is a relationship between the dimensional changes of paper caused by softening agents and the stiffness (elasticity) of softened paper. Apparently, this relationship is independent of the *chemical nature of the softener,* and so the dimensional change in the paper is a measure of the stiffness of softened paper.

The samples studied are two "duplication papers," a greaseproof parchment paper from unbleached sulfite, and a handsheet made from 70 per cent cotton and linen and 30 per cent bleached kraft. All samples are practically unsized. These are treated five minutes with solutions of the softening agents (up to 30 per cent), then pressed at 15 gm./sq. cm. for five minutes and finally air dried at 50 per cent relative humidity. Clark's technique for elasticity measurement (cf. Paper Trade J., 100, No. 13, 41 [Mar. 28, 1935]) is followed and the rigidity factor (G) (given in 10^{10} dyne cm.$^{-2}$) is applied. $G = \frac{L^3 W}{t^3}$

where L is the critical length (at 90°), t is the thickness and W is the basis weight in grams per square meter of the sample. The relationship between G and the dimensional change (per cent d) in the case of the two duplicating papers is shown in the accompanying figure (a and b).

The softeners used are glycerine, trimethyl-benzylammonium chloride ("Triton H"), N-cetylpyridinium chloride (Aerosol M), ammonium lactate, the hydrochlorides of ethanol-, isopropanol- and isobutanol-amines and diethanolamine sulfamate. Satisfactory softening agents would of necessity be effective swelling agents for cellulose. J. Kubat. *Svensk Papperstidn.,* 56, 8-10 (1953). (In German, with English summary).

Refining groundwood rejects

To meet the increased demand for more effective refining of groundwood rejects, new refiners are being installed in mechanical pulp mills in Norway, and comparative experiments are being carried out with different types of refiners. In this article, the discussion is limited to two, the Bauer Double Disc Refiner (I) and the Haug Koller Mill (II).

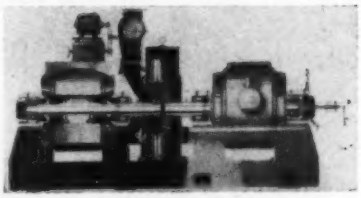


Fig. 1—Bauer refiner

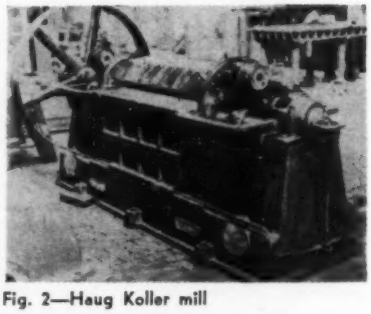


Fig. 2—Haug Koller mill

The treatments of rejects are quite different in the two cases. I produces a long-fibered, high quality pulp, but the power consumption is high. The pulp from II is short fibered and weak, but the power consumption is very low (possibly below that of other refiners used in groundwood mills). Figs. 1 and 2 show the two pieces of equipment. Haldor Ottar. *Norsk Skogindustri,* **6,** 411-418 (1952). (In Norwegian, with brief English summary.)

Leatherette paper

The term "synthetic leather" is reserved for all products using a fabric base. "Leatherette" paper is a coated, lacquered, embossed paper which has a grain that simulates genuine leather; its requirements are those of any good quality coated paper. Special attention is given to uniformity of formation and to the absence of weak spots.

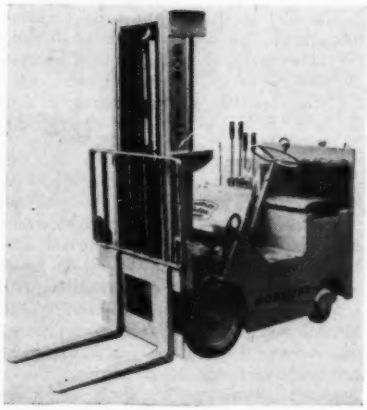
Furnish for lower grades may consist of 60 per cent groundwood and 40 per cent chemical pulps. On the other hand, when a stronger base is required (for papers that are subjected to deep embossing), some rag stock may be added.

For lacquering purposes, synthetic resins are often used. Since most leatherette papers are laminated to board, their strength properties are not too significant. "Paper-base leather," however, is used alone; this is produced by impregnating absorptive filter paper with latex (natural or synthetic) and then lacquering in a manner similar to that used in other leatherette papers. The wet strength of the paper base can be increased by using such resins as polyethyleneimine, without impairing the absorptivity of the paper.

"Leather fiber" consists of scrap leather that has been pulped and mixed with cellulose fibers and suitable binders, and then formed into thick boards on a wet machine. Such fiber boards find different applications in the shoe industry. Kurt Engel. *Wochbl. Papierfabr.,* **80,** 703-4 (1952). (In German.) Through *Bull. Inst. Paper Chem.,* **23,** 270 (1952).

wherever paper is made...
BOWSER ESTABLISHED 1885 is on the job!
METERING | OIL STORAGE
FILTERING | LUBRICATING
Bowser lubricating systems are used wherever paper is made and over the years have built an outstanding reputation for cutting downtime losses and maintenance costs, and for staying on the job day-in-and-day-out for years.
To accurately meter alum, size or other liquids — to obtain effective liquid filtration — call in a Bowser engineer. They're at your service. No obligation, of course!
BOWSER
CALL or WRITE TODAY For Complete Information
BOWSER, INC., 1371 CREIGHTON AVE., FORT WAYNE 2, IND.
REGIONAL OFFICES: ATLANTA • CLEVELAND • DALLAS • FORT WAYNE • KANSAS CITY • NEW YORK • SAN FRANCISCO WASHINGTON, D. C. • CANADIAN PLANT AND SALES, HAMILTON, ONT.

The Paper Industry New Products



Fork lift truck

Mobilift's exclusive "Mobil-Spring" independent rear wheel suspension has been engineered into a new 3,000 lb. HR sit-down type fork lift truck. The suspension, designed to cut down driver fatigue and give the load and vehicle less shock, consists of a heavy-duty spring and an airplane-type shock absorber for each rear wheel.

Mounting and dismounting is easy because there are no levers or housings to straddle. Simple Lev-R-Matic push-pull operating levers are conveniently located on the right side. The lift mechanism retains Mobilift's full-visibility roller chain lift with hydraulic tilt cylinders.

The equipment is powered by a heavy-duty air-cooled 3-cylinder engine and has a two-speed transmission. A new, improved air intake pulls engine-cooling air through a grilled opening channeled through the counterweight. An air filter can be placed inside the grill. The new intake also makes it possible to easily service the flywheel end of the engine. *Mobilift Corp., 409 S.W. 13th Ave., Portland 5, Ore.*

Mercury vapor illuminator

A new mercury vapor illuminator for steam gages permits instant and accurate gage readings of the boiler water level over longer distances, through dust particles in the air or deposits on the gage glass, or in poorly lighted areas.

When a gage is equipped with this illuminator, the water column shows blue-green, topped with an intensely brilliant emerald green spot at the water level, to give water level indication. The illuminator is designed to take full advantage of optical principles. It consists of a mercury vapor bulb enclosed in a steel housing and a ballast box equipped for easy mounting at a convenient spot. The illuminator clips to the gage cover with two sets of brackets.

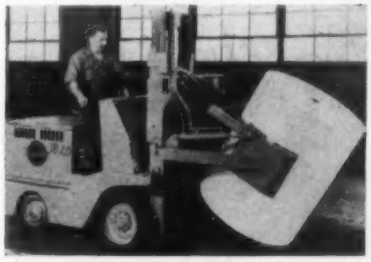
The illuminator is furnished in weather-proof construction suitable for outdoor use. It is manufactured in sizes to fit standard gage sizes and is also available with a 100 w incandescent bulb for use on low pressure steam service gages. *Jerguson Gage & Valve Co., 80 Fellsway, Somerville 45, Mass.*

Screw pump

A new internal gear and bearing type screw pump for positive displacement of lubricating fluids or semi-fluids has recently been announced.

Special points of interest in this new type pump are: the heavy-duty bearings just inboard of the timing gears where radial load is heaviest; lock nuts behind the timing gears for faster, more simple repairing, and double-row angular contact ball bearings at the rear end which position the rotors axially for less wear on the bearings and timing gears.

Other advantages are: interchangeable rotor screws; no metallic contact between the rotors; only suction pressure on stuffing boxes, and direct-connection up to 1800 rpm for use with high speed motors. *Sier-Bath Gear & Pump Co., Inc., 9252 Hudson Blvd., North Bergen, N.J.*



Roll clamp attachment

A quickly detachable roll clamp attachment for fork trucks, designed to pick up and stack cylindrical objects either horizontally or vertically, has recently been developed.

The new clamp allows truck operators to pick up and haul paper rolls, drums, large pipe or any other cylindrical material from 1½ ft. to 3 ft. in diameter. It rotates 90° in a vertical plane, so loads may be stacked either vertically or horizontally. Clamping pressure is controlled by an adjustable relief valve in the hydraulic system, permitting operators to control clamping pressure for each type of material handled.

Installed on Baker's 4 Purpose Carriage, a special fork truck carriage which combines the features of fork-spacing, side-shifting, clamping and standard fork use, the clamp detaches in two minutes, according to the

ENGLISH ECCO CLAYS TRADE MARK CLAYS

UNIFORM • SUPERIOR • DEPENDABLE

English China Clays Sales Corporation
551 Fifth Avenue, New York City

PERFECT

SURFACE

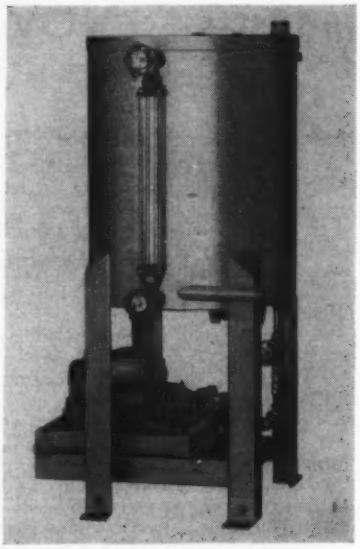
WIRES

FOR OVER

50 YEARS

WISCONSIN
WIRE WORKS
APPLETON • WISCONSIN

manufacturers. This new attachment is available for any Baker fork truck from 1000 to 4000 lb. capacity. *Baker-Raulang Co., Baker Industrial Truck Div., 1230 West 80th St., Cleveland 2, Ohio.*



Chemical feed system

A new compactly designed "packaged" chemical feed system is now available. The package unitizes the basic elements of a chemical feed system, reducing field piping and offering savings in installation time and space.

The unit consists of a 50 to 500 gal. carbon steel chemical solution tank mounted over a controlled volume pump. Piping is supplied for the suction line, complete with valves and sight gauge. Accessory equipment can also be supplied. *Milton Roy Co., 1316 East Mermaid Lane, Philadelphia 18, Pa.*

Pallet truck

A new 4,000-lb. capacity high lift pallet truck has been added to the Yale Worksaver line of motorized hand trucks. It is designed to transport and stack skid bins or single-faced pallets.

This new truck will stack at heights up to 120 in. It has side caster wheels for stability and constant floor contact under all operating conditions. Pallet forks are used instead of conventional forks for minimum over-all truck length and lowered fork height that will accommodate single-face pallets. *Yale & Towne Mfg. Co., Philadelphia 15, Pa.*

Conveyor belt

A new conveyor belt for carrying packages or articles up or down inclines of 25 to 30 degrees has recently been announced.

This belt, known as the "Tread-Top," has a non-skid cover that grips like the tread on a tire. It is made with a special lightweight, closely woven full width fabric of exceptional tensile strength. It is not folded and has no splices. Because of its flexibility, this belt is said to run over pulleys as small as 2 inches in diameter.

The belt is made with natural rubber throughout. The non-skid cover is all natural rubber and a skim coat is used between all plies. It is calendered and press cured the same as the heaviest conveyor belt. *Baldwin Belting, Inc., 76 Murray St., New York 7, N.Y.*

Flow colorimeter

A new flow colorimeter which greatly simplifies the continuous analysis and control of flowing or static streams in liquid or gaseous processes is now available. This instrument is used for controlling the bleaching of paper pulp, the continuous indication of color and turbidity in municipal and industrial waters, measuring chlorine gas in air, "sniff gas" analysis, and many other operations.

This flow colorimeter has a total spectral range from 350 to 1000 millimicrons, and the instrument is so designed that any desired spectral region within this range can be obtained by the use of interchangeable filters.

When handling highly corrosive gases or liquids, full protection for the instrument is provided by a design feature which permits intermittent or continuous purging of the case with an inert gas through readily accessible inlet and outlet ports provided for this purpose.

Water cooling coils placed around the tungsten lamp and two walls of the cell compartment maintain equilibrium temperature of the instrument within two degrees of room temperature. *Beckman Instruments, Inc., South Pasadena, Calif.*

Rubber base paint

A new rubber base paint formula, known as Floorkote enamel, is developed on a synthetic rubber-resin base, not water emulsion, and has unusual durability on masonry floors, both old and new, according to the manufacturer.

This paint dries to a gloss in four hours, seals the floor and will not react with caustic soaps or cleaning compounds. It cannot saponify or rub off because of alkalies present in the concrete. *Tropical Paint & Oil Co., Cleveland 2, Ohio.*

MILL COGS

We make a specialty of "Ready Dressed" cogs which are READY TO RUN the moment driven and keyed. Write for circular "O" and instruction sheets free.

The N. P. BOWSHER Co., South Bend, Ind.

New Products Briefs . . .

ELECTRICAL TAPES—A new and complete line of electrical tapes includes a four-coated, ravel-free friction tape, a quick-fusing high-dielectric rubber tape, and a two-in-one plastic tape. This tape provides both insulation and protection against weather and mechanical abuse. It has a dielectric strength of over 8,000 v. The tape is highly resistant to acids, alkalies, corrosive salts, water, oils, greases and alcohols. *Ideal Industries, Inc., 4162 Park Ave., Sycamore, Ill.*

ANTI-RUST PAINT—A new aluminum anti-rust paint, known as PCA-102 Aluminum, is made of doubly pigmented aluminum mixed with a clear base vehicle. Because of the clear anti-rust base, it can be applied easily and quickly without the base "bleeding" through, has a brighter appearance, and permits better "leafing" of the aluminum flakes to form a moistureproof coating. *Paint Corp. of America, Fidelity Bldg., Cleveland 14, Ohio.*

FLOORING MATERIAL—A new type flooring material, known as Latex-O-crete, is designed to resist the destructive action of chemicals, many acids, oils, food fats and acids, fruit juices, solvents and other items which cause deterioration of floors. It may be applied directly over the old surface at an average depth of only ¼ in. No special floor preparation is necessary other than thorough cleaning. It will withstand considerable heavy traffic from materials handling equipment and may be applied outside or inside. *United Laboratories, Inc., 16801 Euclid Ave., Cleveland 12, Ohio.*

CARBOY DUMPER—The Speedo safety carboy dumper No. 77, for use with hoists or overhead conveyors, permits quick, safe handling of acids. The dumper permits the carboy to be tilted to any angle and locked in position to assure steady pouring. Chains at the bottom and top of the carboy keep wood from splitting or pulling out during handling. *General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.*

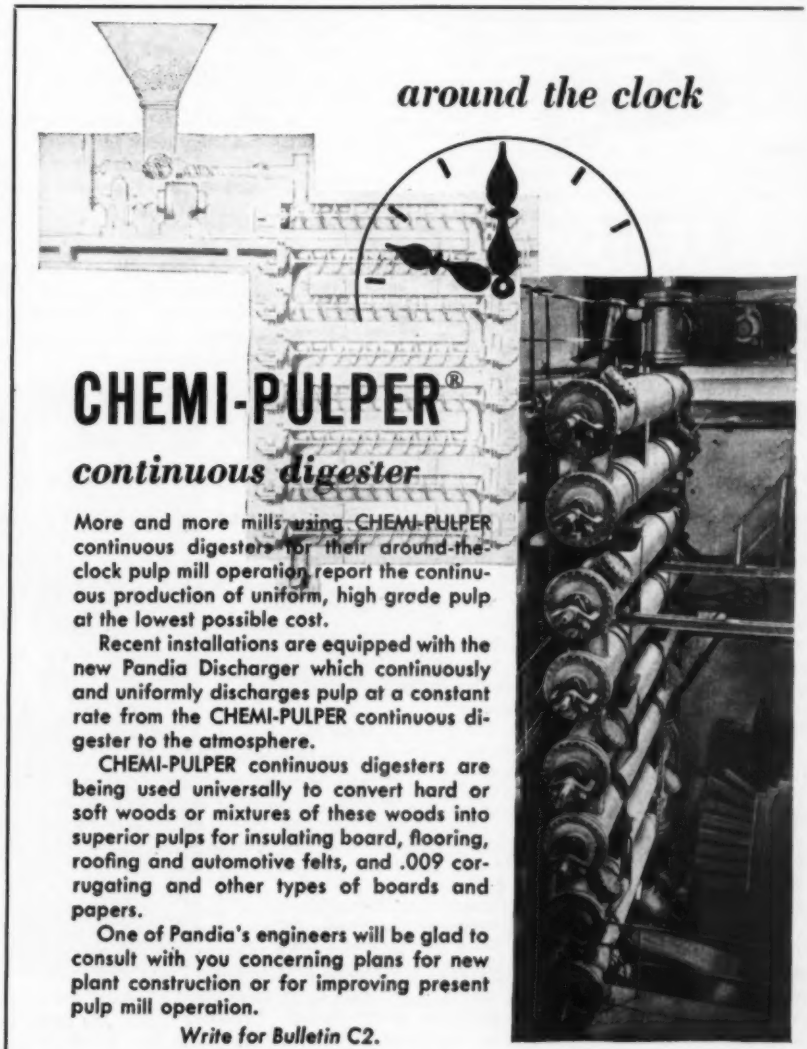
RUBBER HOSE—A special type of high-pressure industrial rubber hose called Wiretex has the following characteristics: strength, flexibility, oil and abrasion resistance, and an ability to satisfactorily withstand effects of both high and low temperatures. It is made with a mandrel cured, Reprene tube in lengths up to and including 60 ft. *Dept. W, Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 1, Ohio.*

FORK LIFT TRUCKS—Two completely new fork lift truck models have recently been released to industry. They are an 8,000-lb. capacity truck (ZA-80) and a 6,000-lb. capacity model (XA-60). Both are gasoline-engine powered and mounted on pneumatic tires. Among the many new mechanical features of both trucks are a long-life clutch that can be completely removed or installed in less than an hour and large heavy-duty disc-type industrial brakes that eliminate many service and maintenance problems. *Hyster Co., 2902 N. E. Clackamas St., Portland 8, Ore.*

WET STRENGTH RESIN—Uformite 711, a low-cost modified urea-formaldehyde resin in aqueous solution, is designed to impart wet strength to a wide range of paper products. It also improves dry tensile, mullen, fold, and pick resistance. Wet rub of starch coatings is said to show significant improvement with the addition of the new resin. Uformite 711 can be used as supplied without acid treatment or aging. The resin can be diluted to any desired concentration without loss of stability. Freedom from sensitivity to sulfate ion is an important feature. *Rohm & Haas Co., Dept. RG, Washington Square, Philadelphia 5, Pa.*

DEODORIZER—The new Rid-All double bulb electronic deodorizer uses the Westinghouse Odorout bulb, which emits light rays on a wavelength that makes the oxygen in the air become ozonated. When this ozonated air comes in contact with any odor, it combines with the odor and oxidizes it completely; and the air returns to its original state with no residue of artificial odor. No chemicals are used. It will effectively deodorize spaces up to 1,800 cu. ft. *Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica 32, N.Y.*

SWITCHES—A new series of snap-action switches, designed for actuating forces as low as ½ ounce, are provided with rigid lever integral actuators which adapt them to actuation by cams or by straight-line motion. The new series is particularly useful in low-force, cam-actuated applications on timing clock motors, instruments and meters. The switches are also widely used in rotary switch assemblies, in sequence switching gangs, and in general limit switch applications. *Micro Switch, Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.*


around the clock
CHEMI-PULPER®
continuous digester
More and more mills using CHEMI-PULPER continuous digesters for their around-the-clock pulp mill operation report the continuous production of uniform, high grade pulp at the lowest possible cost.
Recent installations are equipped with the new Pandia Discharger which continuously and uniformly discharges pulp at a constant rate from the CHEMI-PULPER continuous digester to the atmosphere.
CHEMI-PULPER continuous digesters are being used universally to convert hard or soft woods or mixtures of these woods into superior pulps for insulating board, flooring, roofing and automotive felts, and .009 corrugating and other types of boards and papers.
One of Pandia's engineers will be glad to consult with you concerning plans for new plant construction or for improving present pulp mill operation.
Write for Bulletin C2.
Manufactured and Sold in Canada by
THE ALEXANDER FLECK LIMITED, OTTAWA, CANADA.
PANDIA
PANDIA INC.
122 EAST 42nd STREET • NEW YORK 17, N. Y.

The Paper Industry New Literature

Books

SOYBEAN BLUE BOOK. 1953 Edition. Published by American Soybean Association, Hudson, Iowa. 160 pages. $3.00. Latest authoritative information on the soybean crop and industry is presented in this new book. Assembled for quick reference are the latest available statistics on production, prices and utilization of soybeans, meal and oil. A number of new tables and graphs are included for the first time this year. There are directories of soybean processors, oil refiners, and manufacturers using soy products in their operations, as well as firms offering their services and products to the soybean industry.

FORESTS FOR THE FUTURE. Edited by Dr. Rodney C. Loehr. Published by Forest Products History Foundation, Minnesota Historical Society, St. Paul, Minn. 283 pages. $3.50.

This book is the story of sustained yield forestry as revealed in the diaries and personal papers of David T. Mason, one of the nation's well known private foresters. It recounts events which led Mr. Mason to champion the idea that private industry should take the lead in conservation by growing new trees at a rate commensurate with its cutting of old stands.

From Gifford Pinchot and Theodore Roosevelt, who dominated the early part of this century's forest history, to the present-day champions of sustained yield in both industry and government, Mr. Mason and Dr. Loehr shed new light on recent economic history. Previously unpublished information on the forest industries' efforts in both World Wars is given. Chapters covering the life and death of the NRA's Lumber Code Authority, which Mr. Mason headed, will be of special interest to those concerned with the history of government regulation of business.

A roster of hundreds of lumbermen, foresters, cruisers, government workers and officials who have played a part in recent forest history is included in this volume.

FINANCIAL MANAGEMENT FOR THE SMALL BUSINESSMAN. By L. A. Tungate. Published by Chapman & Grimes, Inc., 30 Winchester St., Boston, Mass. 132 pages. 5½ x 8¾. $3.00.

Based on accounting principles, simply explained to bring out the practical aspects of financial management, this book emphasizes the value of carefully analyzing the financial information available to the small businessman through simple record keeping.

Each chapter endeavors to show how profits can be increased, losses reduced, and how the small businessman may keep out of financial difficulties by the proper analysis of his accounting records. Topics covered in the six chapters of this book are: budgets, cost control, inventory control, financial statements, ratios, and turnovers.

While it is stressed that this book is especially written for the small businessman, the corporation executive will discover that it gives him a better understanding of the many financial reports he has to examine.

CONTROL OF ELECTRIC MOTORS, Third Edition. By Paisley B. Harwood. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 538 pages. $7.50.

This book, which contains an up-to-date description of the design, construction, and application of controllers, is directed not only to professional consulting engineers, but to motor and machine tool builders and maintenance men in various industries as well.

Arranged entirely by motor types, this revised edition now includes material on automatic regulating systems, and new data for calculating accelerating and decelerating time of a mechanical system. The discussions of dc and ac motors cover the operation and characteristics of each motor, the methods used to control it, and the design of the various types of control for that particular motor. Sections on pilot devices and accessories, wiring diagrams, and construction details are also given.

Booklets and Pamphlets

STIFFNESS OF PAPER (RP2376). By F. T. Carson and Vernon Worthington. Published by National Bureau of Standards, U. S. Department of Commerce, Washington 25, D. C. Seven pages. 10 cents. (Order from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) A reprint from the *Journal of Research*, this pamphlet describes an instrument for determination of stiffness of paper and gives evaluation of stiffness of paper, or bending moment per unit of width of specimen producing unit curvature, for eight types of paper, for various lengths and widths of specimen, and for bending angles from 5° to 30°.

PUBLICATIONS OF THE LAKE STATES FOREST EXPERIMENT STATION 1949-1951 (Station Paper No. 15—Supplement No. 1). Published by Lake States Forest Experiment Station, U. S. Department of Agriculture, Forest Service, University Farm, St. Paul 1, Minn. 8 x 10½. 20 pages. A supplement to Station Paper No. 15, which lists publications from 1923 to 1948, this booklet brings the list up to date. The titles have been arranged into eight classes according to subject matter. Within each class the titles have been listed alphabetically by authors, and the writings of each author have been arranged in chronological order. Each publication has been assigned a number, and at the end of the booklet there is an index giving the numbers of articles published by each author.

THE PROBLEM OF MAINTENANCE COSTS. By Jackson D. Leonard. Published by R. S. Aries & Associates, 400 Madison Ave., New York 17, N. Y. 6 x 9. 10 pages. This new pamphlet discusses the profits lost through poor and inefficient maintenance practices and what companies can do to improve performance in this department.

ANNUAL REPORT OF THE NATIONAL FOREST RESERVATION COMMISSION FOR THE FISCAL YEAR ENDED JUNE 30, 1951 (Document No. 94). Published by United States Government Printing Office, Washington 25, D.C. 28 pages. 5¾ x 9. In addition to the annual report, a list of the personnel of the National Forest Reservation Commission is presented. Also included is a map of the United States showing national forest purchase units approved by the Commission or authorized by special acts of Congress.

BUILDING UP WORN PARTS BY ELECTRODEPOSITION (article reprint). By A. W. Hothersall. Published by International Nickel Co., Inc., 67 Wall St., New York 5, N.Y. 8½ x 11. 6 pages. This booklet discusses the salvaging of worn or overmachined parts by plating to build up surface for repair. It reviews such technical factors as hardness and strength of deposit, adhesion, stresses and uniformity of deposit thickness. How deposits affect properties of the basis metal (steel) and how to proceed with repair are described.

Manufacturers' Publications

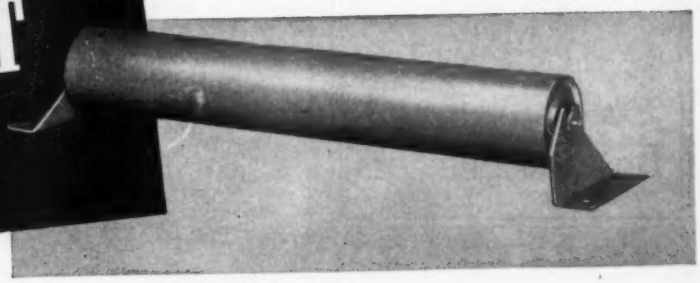
Through the co-operation of manufacturers and suppliers, THE PAPER INDUSTRY lists the following catalogues, bulletins and booklets. They may be obtained without cost or obligation, unless otherwise specified, by writing direct to the manufacturers. Please address requests on your company letterhead.

Wet-Strength Resins. Hercules Powder Co., Wilmington, Del.—The advantages of using Kymene resins in wet-strength paper toweling are illustrated in a new leaflet. A sample of paper toweling that contains Kymene resin is included.

Clamp Cutter. E. P. Lawson Co., 426 West 33rd St., New York, N.Y.—The 39-in. heavy-duty automatic clamp cutter, Series "V", is described in this new catalogue.

Packaging. Bakelite Co., Div. of Union Carbide & Carbon Corp., 300 Madison Ave., New York 17, N.Y.—This new 12-page pamphlet, entitled "1953 Guide to Improved Packaging with Bakelite and Vinylite Plastics and Resins," contains more than 60 photographs illustrating packaging applications of Vinylite, polyethylene, styrene and phenolic plastics and resins. The properties, advantages, packaging applications and fab-

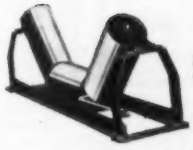
LINK-BELT IDLERS



...the long-life answer to higher belt conveyor efficiency

MORE and more mills are moving pulpwood logs on belt conveyors. One big reason: the years of low-cost, high-efficiency service provided by Link-Belt flat roll idlers. As on all Link-Belt roller bearing idlers, power consumption is reduced . . . maintenance minimized.

Flat roll idlers are only part of the full Link-Belt line. Also included are 20° and 45° troughing, impact-cushioning and belt-training idlers. And for high-capacity chip handling, be sure to find out about Link-Belt's 45° idlers. See your Link-Belt sales representative or distributor for new Book 2416.



Series "400" 45° chip-handling idler

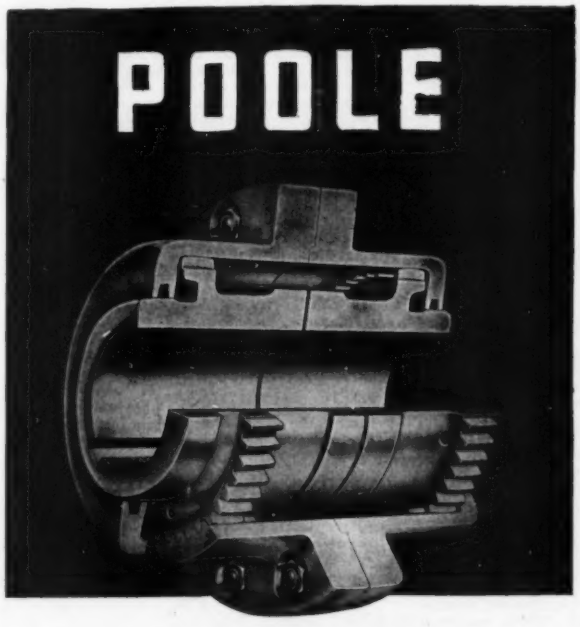
Series "100" 20° troughing idler

LINK-BELT

ROLLER BEARING IDLERS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle, Toronto, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 19.222

POOLE

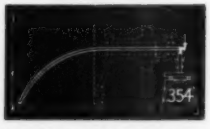


A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

FLEXIBLE COUPLINGS

POOLE FOUNDRY & MACHINE COMPANY WOODBERRY, BALTIMORE, MD.

Reaction of ¾" Auto-Flex in 48" dia. dryer. Very low leverage.

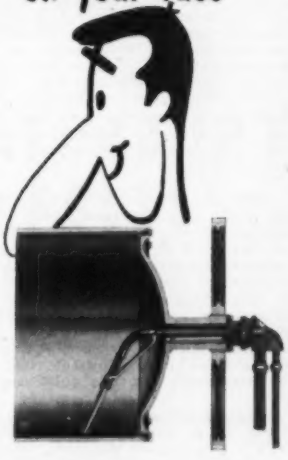


Reaction of ¾" ordinary bent pipe. Syphon in 48" dia. dryer. High leverage.

The above cuts and captions tell the Midwest Auto-flex Syphon story—and it's as plain as the nose on your face.

End of pipe takes correct position and cannot possibly change its position. That means proper water and air removal. Reduced leverage, compared to other syphon pipes, permits the "pipe" to clear and stay clear of the journal. And that means freedom from wear, hence far longer life.

as plain as the nose on your face



Thousands of Midwest Auto-Flex Syphons in use and doing fine. A dozen orders from you would prove all claims and makes you an Auto-flex booster. Remember, they're fully guaranteed.

MIDWEST-FULTON MACHINE COMPANY

DAYTON, OHIO

The Paper Industry
Professional and Business Services

Engineers
Industrial Plants • Textile & Paper Mills • Location Studies • Appraisals • Reports • Surveys
J. E. SIRRINE COMPANY
GREENVILLE, SOUTH CAROLINA

ricating methods for the various forms of Bakelite and Vinylite plastics and resins are presented under the following headings: Coatings, Molded and Blown Plastics, Sheet Materials, Film and Sheeting, Packing Materials, and Adhesives.

Worm Gear Speed Reducer. Cleveland Worm & Gear Co., 3293 East 80th St., Cleveland 4, Ohio—Entitled "Clevelands—At Work!", this 8-page booklet presents "on-the-job" studies of Cleveland worm gear speed reducers in various industries.

Variable Speed Changers. Metron Instrument Co., 432 Lincoln St., Denver 9, Colo.—New miniature variable speed changers are described in this 4-page bulletin, No. 99. Their benefits are listed. Six different speed controls are illustrated and described. New features and outline dimensions are given.

Maintenance Cleaning. Oakite Products, Inc., 116 Rector St., New York 6, N.Y.—This 30-page illustrated guide reviews latest procedures designed to simplify maintenance cleaning in pulp and paper mills. The manual describes specialized materials and methods for performing a wide range of pulp and paper maintenance cleaning and allied operations, such as descaling pulp mill liquor heaters, condensers, evaporators and feedwater heaters; cleaning pulp washers; cleaning pulp screens; cleaning sand and gravel filter beds; removing soils from centrifugal pulp cleaners, etc.

Index of Literature. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Bulletin Index 100-A, containing 20 pages, is an index of technical literature available from Honeywell's Industrial Division. It consists of both a numerical listing and alphabetical cross index for specification sheets, instrumentation data sheets, catalogues and other literature. Included in the alphabetical index are articles from "Instrumentation," the manufacturer's quarterly publication.

Floor Maintenance. A. C. Horn Co., Inc., Tenth St. & 44th Ave., Long Island City 1, N. Y.—This 12-page brochure, "Floors Without Flaws," covers the conditioning, repairing and maintenance methods for such floor materials as concrete, asphalt tile, cork, linoleum, magnesite, terrazzo, wood, rubber, tile, etc. One section of the booklet lists Horn floor coatings, cleaners, sealers and other floor products.

Industrial Waste Treatment. B-I-F Industries Inc., 345 Harris Ave., Providence, R.I.—Bulletin B-I-F No. 4, "Industrial Waste Treatment Guide," consisting of 8 pages, contains a table showing the different types or combinations of unit treatment processes for more than 50 wastes. Another table shows the equipment used in the processes, and a third table shows B-I-F Industries equipment available for use in these waste treatment processes. A two-page spread flow diagram showing how the various treatment processes and equipment may be combined to treat mixed wastes is given. Installation photos of equipment are also included.

Thickness Gage. Gardner Laboratory, Inc., Bethesda 14, Md.—4-page Bulletin No. 110 describes the Gardner thickness gage, presenting its advantages, methods of use and accuracy. The gage stand is also described. A description, method of use, two methods of measurement and examples of results of the gage hardness attachment are given.

Pyrometric Switches. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.—Catalogue 5800, consisting of 12 pages, illustrates and describes rotary, key and plug-type pyrometric switches. Applications and pertinent circuits are also given. Dimensions, mounting details and switch circuits are included.

Process Control Engineers. Equipment & Control Engineers Inc., Box 4446, Pittsburgh 5, Pa.—The services of a new organization specializing in the designing, engineering, and building of special equipment, coordinated process controls and panelboards are described in a new four-page bulletin. Featured in this bulletin are the key men of this organization, along with a list of those industries where their services can best be utilized.

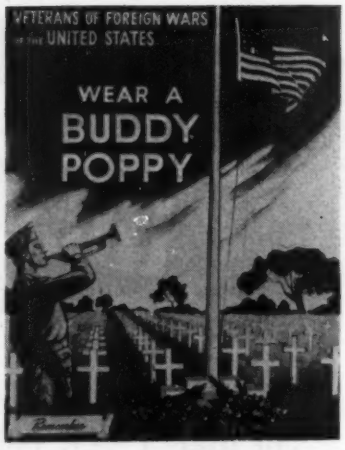
Saran-lined Nozzle. Builders-Providence, Inc., 345 Harris Ave., Providence 1, R.I.—Bulletin 130-J6 gives pertinent information of the uses of the Saran-lined Venturi nozzle and shows a sectional view of the Model NZSL, a flanged type differential producer without piezometer rings, designed for corrosive liquids and slurry service. A list of corrosive liquids that can be metered with the Saran-lined nozzle is presented, in addition to a ratio chart and capacity table for obtaining capacities for liquids other than water.

Electrical Measuring Instruments. Associated Research, Inc., 3758 Belmont Ave., Chicago 18, Ill.—A new quick reference data sheet, Bulletin 10AA, covering a complete line of electrical measuring instruments, lists models for insulation resistance, ground resistance, and high voltage testing, plus other special purpose instruments.

Steam Trapping. Yarnall-Waring Co., Philadelphia 18, Pa.—"Please Pass the Condensate" is a new 20-minute color and sound motion picture on the subject of up-to-date steam trapping for more production. It portrays the operation, selection, application and maintenance of steam traps—all with the ultimate aim of getting more production from steam heated equipment through reduced heat-up time and hotter operating temperature, as well as shortened down-time for repairs and cleaning.

Adjustable Speed Drive. General Electric Co., Schenectady 5, N.Y.—"Thy-mo-trol" (thyratron motor control) drive, what it consists of and how it operates, is described in two new 4-page bulletins. A simplified "Thy-mo-trol" drive for ¾ to 3 hp applications is discussed in Bulletin GEA-5829. Photos and diagrams are used to explain the system which is designed for use on testing equipment, printing presses, conveyors, variable-volume or proportioning pumps, and other applications. A precision-controlled "Thy-mo-trol" drive for ¾ to 10 hp applications is described in bulletin GEA-5827. This packaged adjustable-speed drive is for application on machine tools, reeling equipment, processing equipment, conveyors, textile machines, and many others.

Purifiers. V. D. Anderson Co., Purifier Div., 1935 West 96th St., Cleveland 2, Ohio—"End Dirt and Moisture Problems the Hi-eF Way" is the title of a new 8-page bulletin (No. 700) which describes the many uses of purifiers (mechanical separators) in various industries, as well as in all steam generation and distribution systems. Cutaway views showing the installation of purifiers in 14 different applications are accompanied by



a brief description highlighting the purpose of the purifiers in each case. Information is also given on the types of entrainment likely to be found in the various vapors and gases. Seven types of purifiers are briefly described.

Shower Pipes. Sandusky Foundry & Machine Co. Sandusky, Ohio—4-page Specification Bulletin No. 136 contains detailed, written and illustrated technical information, installation procedure, and water consumption data relative to the Chief Sandusky shower.

Expansion Joints & Metal Hose. Flexonics Corp., 1315 South Third Ave., Maywood, Ill.—Complete specifications and supporting data is given for the recently designed Flexon line of expansion joints in a new 16-page catalogue (CMH-128). Also covered is complete specification and application information for CMH corrugated and convoluted types of flexible metal hose, including couplings, flanges, nipples, and assemblies. Installation instructions are included.

Conveyors. Stephens-Adamson Mfg. Co., Aurora, Ill.—Designated as Vol. 202, this 18-page booklet contains articles showing conveyors in operation in various industries. One article describes how the conveyor-elevator lifts wood chips at S. D. Warren Co., Cumberland Mills, Maine.

Strainers. S. P. Kinney Engineers, Inc., 201 Second Ave., P. O. Box 445, Carnegie, Pa.—This 12-page booklet contains complete descriptions, illustrations, diagrams, and pertinent engineering data regarding the Brassert automatic self-cleaning strainer, the Kinney automatic self-cleaning strainer, and the Kinney manually operated self-cleaning strainer.

Pressure Regulators. Fischer & Porter Co., 749 Jacksonville Rd., Hatboro, Pa.—8-page Catalogue 29 describes the new constant pressure differential regulator and the new instrument air pressure regulator. Diagrams, photographs, and a graph are included.

Boiler-Burner Units. Kewanee-Ross Corp., Kewanee, Ill.—This 14-page catalogue gives a full description and complete data on the entire line of new Kewanee-Iron Fireman boiler-burner units that will enable you to select the proper unit for any particular application to high or low pressure heating, power or process steam.

Correction

The news item describing the booklet on boiler water conditioning, appearing in the February issue of THE PAPER INDUSTRY, erroneously listed the address of E. F. Drew & Co., Inc., as Palmo, N. Y. The correct address is 15 E. 26th St., New York 10, N. Y.

FOR THE ARMED FORCES
We are contributing to the nation's defense program by providing a large part of our increased production facilities for building precision armaments.

LAMINATOR GL-2 ▶
LAMINATES PAPERS, FOILS, CELLOPHANES, TO PAPERS, BOARDS WITH PASTES • GLUES • ASPHALTS

Better bonding...Greater productivity

MULTI-PURPOSE
LAMINATOR
for processing paper, boards and cellulose products . . .

HUDSON-SHARP
MACHINE CO • GREEN BAY • WIS
Manufacturers of
Printers, Embossers, Folders, Interfolders, Waxers, Laminators, Wrapping Machines, Core Winders, Packaging Presses, Crepers and Napkins, Toilet Tissue and Paper Towel Units.

THE all-purpose GL-2 Laminator uses materials direct from parent rolls and rewinds, after laminating with either hot or cold glues and pastes. The machine is so designed that each operating assembly can be readily changed to handle the ever-growing list of new laminants and materials. Completely flexible, it can be rearranged for longer sheet leads . . . new assemblies added . . . or old ones subtracted. Standard 60-inch unit has one hot or cold dryer and is equipped with paste or glue applicator. An asphalt applicator may also be added. Provisions are made for by-passing the sheet so that either of the two applicators can be used with equal facility. Additional drying units can be added to speed production by faster sheet curing if desired. Similar laminators are made for use with wax, crystalines and hot melts. Rewinders and backstands of various types can be furnished. Write for complete details and specifications.

PHOTOVOLT
Photoelectric REFLECTION METER

for accurate measurement of
Brightness and Opacity
of pulp and paper in terms of TAPPI specifications.
Also for
Gloss and Color
tests on paper, cardboard and other paper products.
Portable, reliable, rugged, simple to operate

PHOTOVOLT CORP.
95 MADISON AVE. NEW YORK 16, N. Y.
Also: Colorimeters, pH Meters

Oriskany
WATERBURY FELTS

Matching the skill of paper-makers with felts that meet their most precise requirements is a job we've been doing since 1869. Today, as always, our research department is working with several mills to perfect paper-making techniques. We offer mill operators the services of our staff to help you solve your particular problems. We welcome your inquiries.

H. Waterbury and Sons Co.
Oriskany, New York

Index to Volume Thirty-Four of

The PAPER INDUSTRY

April, 1952—March, 1953

Page numbers in this index are preceded by numbers of the issues—April, 1952, is No. 1 and March, 1953, is No. 12

A

Abbott, T. S., Bulk unloading problems—how to avoid them ... 7, 854
A market analyst looks at chemical trends in pulp and paper ... 8, 977
Ample sulfur for '53; production increased in 28 projects ... 10, 1221
An accelerated freeness test for slow stock ... 3, 359
Analysis of variable speed requirements ... 10, 1235
Animal glues provide economy and facilitate papermaking ... 9, 1115
Annett, S. R. P. and Stobo, W. E., Utilization of sulfite pulp mill wastes ... 9, 1109
Annual report of Kalamazoo anti-pollution group encouraging ... 7, 833
APPA holds 76th annual meeting ... 12, 1466
Atchison, Joseph E., European pulp and paper industry, its recovery and potential strength ... 7, 857

B

Barges help solve Chesapeake's materials handling problems ... 10, 1240
Beck, C. D., The sectional paper machine drive and operating efficiency ... 7, 862
Behavior of paper under stress ... 4 482
Better paper through engineered lighting ... 3, 366
Broughton, Geoffrey, Behavior of paper under stress ... 4, 482
Buchanan, M. A. and Wise, Louis E., The chemistry of the cellulosic wood fiber ... 10, 1229
Bulk unloading problems—how to avoid them ... 7, 854
Butler, John J., Job evalulation . . . what it is, how implemented, how used ... 10, 1228

C

Canadian pulp and paper industry investments in expansion continue ... 3, 319
Canadian sulfur dioxide plant begins operations ... 9, 1100
Carter, Roy (See Karassik, Igor J.)
Champion Paper uses the IBM calculator ... 3, 364
Clean pulp from unbarked hardwoods? ... 7, 861
Comprehensive safety at Westvaco's Luke mill ... 8, 980
Congress tackles newsprint problems ... 4, 449
Cook, A. S., Electrical hazards in the pulp mill ... 2, 223
Correct choice of instruments in pulp and paper manufacture ... 12, 1453
CPPA technical section discusses potentials for integrated basic research ... 12, 1484
Cummins, A. A., Paper mill power plant improvements ... 2, 213
C-Z markets by-products of sulfite waste ... 9, 1093

D

Damage liability in the paper industry ... 1, 78
Davis, D. S. and Taylor, Raymond E., An accelerated freeness test for slow stock ... 3, 359
Division meetings held during APPA convention ... 12, 1482
Dyck, A. W. J., PhD., Lee Paper adds new machine ... 2, 217
Dyck, A. W. J., PhD., Monane—America's most modern fine paper mill ... 9, 1106
Dyck, A. W. J., PhD., Paper technologists meet at Murray Bay ... 4, 489
Dyck, A. W. J., PhD., Reigel now in pulp production ... 4, 466

E

Eastern Corp. puts new power plant in operation ... 6, 697
Economy the crux of waste problem 5, 575
Editorials
APPA sponsors safety standards 8, 935
A reminder ... 3, 307
Continued prosperity ... 4, 439
Democracy at Chicago ... 4, 439
Editorial Director appointed ... 5, 567
Fifty per cent accomplishment ... 1, 33
Human Maintenance ... 2, 161
Just to say "hello" ... 6, 687
No more alibis ... 5, 567
Pulp and paper industry's changing chemical requirements ... 8, 935
Pulp washing to baseball ... 3, 307
Season's Greetings ... 9, 1065
Supply and demand in wood pulp 1, 33
The fallacy of profits ... 5, 567
The lignin problem ... 12, 1421
To what extent encourage foreign expansion? ... 7, 817
Trend toward continued expansion ... 11, 1311
What's ahead in the paper industry ... 10, 1197
Electrical hazards in the pulp mill 2, 223
Elk Falls operations—Canadian expansion ... 4, 458
European pulp and paper industry—its recovery and potential strength ... 7, 857
Expanded use of cord products in paper making ... 3, 350

F

Factors involved in wood pulp production—Part II ... 5, 605
Factors involved in wood pulp production—Part I ... 4, 471
Fair, Ernst W., Ten steps to better employee relations ... 9, 1120
Fiberboard Products modernizes and expands in Washington ... 8, 943
Figures and comment on time rate of water drainage ... 12, 1461
Finch, Pruyn installs new fourdrinier ... 1, 56
Fine papers set pace in rapidly expanding Canadian industry ... 12, 1430
First-hand view of Russian industry given by SAPI speaker ... 12, 1474
Fisher, M. H., Magnetic amplification in paper mill controls ... 12, 1450
Forestry activities show increase ... 3, 321
Forestry practices topic of CPPA Woodlands Section ... 2, 226
Further New Brunswick spraying operations planned ... 8, 958

G

Gahl, E. A., Analysis of variable speed requirements ... 10, 1235
Glennie, D. W. and Schwartz, H., Pulpwood decay: effect on yield and quality ... 6, 738
Graham, Charles R., A market analyst looks at chemical trends in pulp and paper ... 8, 977
Graphic panels promote efficiency ... 1, 71

H

Hansell, H. P., Importance of heat insulation ... 2, 220
High dollar and low demand strike Canadian earnings ... 7, 827
Hoberg increases daily production with new Yankee ... 10, 1204
Hopper Paper expansion at Taylorville ... 5, 609
How taxes affect mill improvements 1, 81
Huge New Brunswick spraying operation called effective ... 6, 709

I

Importance of heat insulation ... 2, 220
Increased efficiency with dial 'phones at Camas ... 11, 1319
Increased paper production and better quality through infra-red heating ... 6, 741
Index to Volume Thirty-Three of THE PAPER INDUSTRY ... 1, 83
International's Gatineau mill boosts quality and output ... 7, 850

J

Job evaluation . . . selection of plan to be used ... 12, 1459
Job evaluation . . . top management's role and responsibility ... 11, 1351
Job evaluation . . . what it is, how implemented, how used ... 10, 1228

K

Kahler, W. H. and Werner, W. P., Better paper through engineered lighting ... 3, 366
Karassick, Igor J. and Carter, Roy (Centrifugal Pumps—Series)
Selection of electric motors for centrifugal pump drive ... 2, 210
Selection of electric motors for centrifugal pump drives ... 5, 602
Pump control ... 8, 983
Pump control ... 11, 1358
Kassing, B. L., New paper machine completes Nekoosa-Edwards program ... 11, 1346
Keller, J. A., (see Job evaluation series)

L

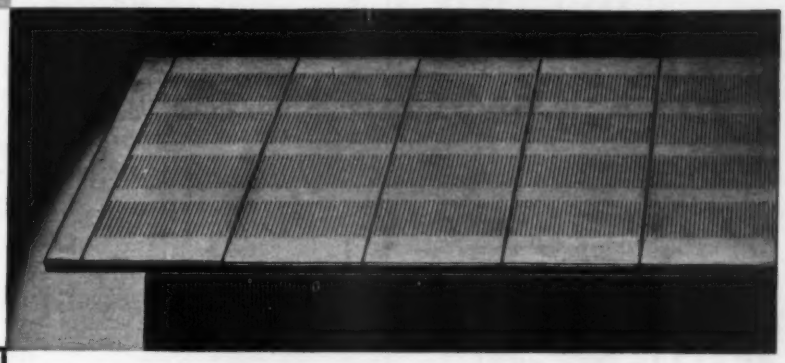
Leaf, R. I., Jr., Little Rapids increases groundwood bleaching capacity ... 5, 596
Lee Paper adds new machine ... 2, 217
Legal riddles: questions and answers 6, 743
Lewis, Floyd A., Expanded use of corn products in paper making ... 3, 350
Little Rapids increases groundwood bleaching capacity ... 5, 596

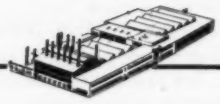
M

Maass, Dr. Otto, Factors involved in wood pulp production—Part I ... 4, 471
Maass, Dr. Otto, Factors involved in wood pulp production—Part II ... 5 605
Magnetic amplification in paper mill controls ... 12, 1450
Maine, Syracuse alumni honor Prof. C. E. Libby ... 12, 1481
Maintenance of electric controllers 1, 74
Manchester Board & Carton project leads mill expansion ... 5, 576
Mando begins modernization at Fort Frances and Kenora ... 12, 1427
Markle, I. E., Maintenance of electric controllers ... 1, 74
McArdle calls for better forestry management, cooperation ... 12, 1436
Mill expansion and improvement continue rapid pace ... 1, 89

MAGNUS THIN-SHEET SCREEN PLATES

for
High Sustained Yield
of
CLEANER PULP





MAGNUS METAL CORPORATION
Fitchburg, Massachusetts
Subsidiary of **National Lead Company**

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME NICKEL-STEEL, AND INCONEL

VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

Magnus screen plates, made of chrome-nickel-steel or inconel, have a high-strength, thin sheet design that's specially engineered for maximum flow. About 40,000 of these plates are now in service, with performance records that prove these three important advantages:

1. Increased Capacity

The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. Longer Life

Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance, too.

3. High, Sustained Yield

Thin-sheet screen plates assure consistent, uniform quantities of cleaner pulp. This means improved production at reduced operating costs.

Complete information is yours on request. Or if you like, we'll gladly have an engineer call.

The Trade-Mark of
Dependable Felts

The Waterbury Felt Company
SKANEATELES FALLS, N. Y.

Nine Publications for Papermakers

Pulp and Paper, Volume I	$15.00
Pulp and Paper, Volume II	15.00
Modern Pulp and Paper Making	9.50
Procedure Handbook of Arc Welding	2.00
Outside U.S.A.	2.50
Drying of Paper on the Machine	1.50
Notes and Observation on Beaters	1.00
Lessons in Papermaking—Part 1	1.00
Lessons in Papermaking—Part 2	1.00
Trouble on the Paper Machine	.75
Pulp Bleaching (A Symposium)	.50
Technology of Papermaking Fibres	.50

Mail your order with payment to:

The PAPER INDUSTRY
431 S. Dearborn Street, Chicago 5, Illinois

COCHRANE
Chemical Company

Specialists in WAXES

For the paper and insulating trade.
Laminating, Paper Coating, Saturating.
Wax concentrates—Heat sealing waxes.
Moisture vapor-resisting waxes.
Petrolatums, wax emulsions.
Dip-coating (conforming to Army-Navy specifications).
Special blends for paper converting.

Write for catalog

COCHRANE CHEMICAL CO.
151 Main Street
Matawan New Jersey

PUT *ACTION* IN YOUR SAFETY PROGRAM

Add a touch of showmanship to your safety program. Films let you tell your training story with the dramatic impact of pictures . . . action . . . sound. You can cut your safety training in half, give fewer refresher courses and get better results by using training films.

Here are three film sets that will help you arouse and keep alive interest in your safety program. And there is no better way to teach foremen how to be better supervisors.

SPEAKING OF SAFETY

A brand new set of films that will teach your foremen and supervisors the tips they should know about making safety talks, and how to transmit management's ideas and plans. Six 35mm sound slidefilms and leader's manual in an attractive leatherette case.

HUMAN FACTORS IN SAFETY

This is a series of six 35mm sound slidefilms with leader's manual that may be used for an advanced safety course. Each film deals with one aspect of the complex art of handling people. Collectively, the films show how to train workers, how to keep experienced people on their toes and how to win respect, cooperation and loyal support.

SAFETY MANAGEMENT FOR FOREMEN

A set of ten 35mm sound slidefilms—all that is needed for a course in safety fundamentals. The films explain how to organize a safety program, what part the foreman plays in the program and how safety increases production. They also discuss specific safety activities, such as machine guarding, safety inspections, the first aid program, etc. Complete with leader's manual in an attractive leatherette case.

Write for complete information and details to the

NATIONAL SAFETY COUNCIL

425 North Michigan Ave., Chicago 11, Illinois

Modern materials handling keys Bay West expansion....10, 1236
Moore, J. C., More Power production with synchronous motors.... 8, 987
Moraine—America's most modern fine-paper mill.... 9, 1106
More power production with synchronous motors.... 8, 987
Murphy, E. A., Graphic panels promote efficiency.... 1, 71
Myers, David Moffat, How taxes affect mill improvements.... 1, 81

N

National Gypsum puts 25th plant into operation.... 2, 206
Nationwide efforts to reduce stream pollution continue.... 2, 184
Nekoosa-Edwards expansion....11, 1344
New construction and modernization projects.... 2, 178
New paper machine completes Nekoosa-Edwards program....11, 1346
Newsprint demand maintains pace as mills operate above capacity.... 7, 844
New urea formaldehye resins for wet strength....11, 1352
Newsprint demand to be met by production 11, 1327
1951 newsprint production estimated at record high....10, 1203
North American newsprint production at record high in 1951.... 2, 171
North America's newest newsprint mill in operation.... 8, 970
Northwest Paper installs new turbines 9, 1077

O

O-M begins logging of rugged Canadian wilderness.... 7, 838
Operational problems take spotlight at 38th annual TAPPI convention 12, 1475

P

Palen, V. W., X-ray calculator for identifying elements....11, 1354
Paper-honeycomb cores for structural sandwich panels.... 9, 1112
Paper industry in U. S. plans expanded production.... 3, 332
Papermaking economics: the new and the old.... 3, 360
Paper mill power plant improvements 2, 213
Paper mill safety discussed at 40th NSC 8, 991
Paper technologists meet at Murray Bay 4, 489
Parker, Leo. T., Damage liability in the paper industry.... 1, 78
Parker, Leo. T., Legal riddles: questions and answers.... 6, 743
Price agreement sought as newsprint production increases.... 1, 51
Progress in steam improvement—the spent sulfite liquor problem..12, 1456
Progress in stream pollution fight continues 1, 46
Pulpwood decay: effect on yield and quality 6, 738

R

Rockwell, R. A., Valve sizing accuracy 10, 1242
Roger C. Griffin TAPPI medalist....12, 1477
Recent advances in wood chemistry 10, 1233
Report newsprint mill planned for Cincinnati area.... 8, 949
Research in forest insect and disease control 11, 1332
Rhinelander Paper puts evaporator into operation.... 9, 1074
Riegel now in pulp production.... 4, 466

S

Schuessler, Raymond, Tensiometer increases Glatfelter production....12, 1463
Schwartz, H. and Glennie, D. W., Pulpwood decay: effect on yield and quality.... 6, 738
Seidel, Robert J., Paper-honeycomb cores for structural sandwich panels 9, 1112
Shattuck, Gordon B., Papermaking economics: the new and the old 3, 360
Shortage of engineers cited at Institute Executives Conference.... 3, 329
Sixty-five million dollar Celgar plan approved 9, 1099
Stam, Alfred, Recent advances in wood chemistry....10, 1233
Stepless speed control of machinery 2, 215
Stobo, W. E. and Annett, S. R. P., Utilization of sulfite pulp mill wastes 9, 1109
St. Regis Florida expansion leads in mill construction.... 4 450
Styrene-butadiene type latex upgrades paper coatings....12, 1460
Successful experiment: barren Nebraska land produces pulpwood.... 6, 710
Sulphur optimism unwarranted, producer asserts.... 6 718
Sulphur shortage virtually ended, manufacturer says.... 5, 588
Superintendents meet at Detroit in 33rd annual convention.... 4, 475

T

Tax cut urged in Wisconsin as pollution aid.... 8, 946
Taylor, Raymond E. and Davis, D. S., An Accelerated freeness test for slow stock.... 3, 359
Tensiometer increases Glatfelter production 12, 1463
Ten steps to better employee relations 9, 1120
The chemistry of the cellulosic wood fiber 10, 1229
The sectional paper machine drive and operating efficiency.... 7, 862
Thirty million gallons of waste liquor for road-building....12, 1440
Tight newsprint supply situation is seen easing appreciably.... 3, 325
Tutt, Richard, Jr., Animal glues provide economy and facilitate papermaking 9, 1115
Two and one-half million dollar torula yeast plant planned to combat pollution 10, 1210

U

Utilization of sulfite pulp mill wastes 9, 1109

V

Valve sizing accuracy....10, 1242
Van Horn, Dr. Willis, Progress in steam improvement—the spent sulfite liquor problem....12, 1456

W

Walter, Leo, Correct choice of instruments in pulp and paper manufacture 12, 1453
Werner, W. P. and Kahler, W. H., Better paper through engineered lighting 3, 366
Westbrook, Francis A., Increased paper production and better quality through infra-red heating..... 6, 741
Westbrook, Francis A., Stepless speed control of machinery..... 2, 215
Westvaco completes modernization project 3, 356
Williamson, Harry, Paper and paperboard making—Series
Fourdrinier Machine fundamental principles—Part 1.... 5, 600
Fourdrinier machine fundamental principles—Part 2.... 6, 735
Fourdrinier machine fundamental principles—Part 3.... 7, 859
Fourdrinier machine fundamental principles—Part 4.... 8, 975
Practical examples of slice control 9, 1117
Practical examples of slice control—Part 2....11, 1356
Wisconsin anti-pollution progress ranks high in world....11, 1324
Wisconsin maintains effort toward reducing sulphite pollution..... 3, 338
Wise, Louis E. and Buchanan, M. A., Chemistry of the cellulosic wood fiber 10, 1229

X

X-ray calculator for identifying elements 11, 1354

Z

Zeigler, D. W., Modern materials handling keys Bay West expansion 10, 1236

SULPHITE MILL ACID PLANTS

Sulphur Burning Plants • Jenssen Two Tower Acid Systems • Gas Coolers—Surface and Spray Type • Jenssen Pressure Acid Systems • Jenssen Auxiliary Process Towers • Recovery Plants—Cooking Acid

SOLUBLE BASE ACID PLANTS
SEMI CHEMICAL PLANTS
JENSSEN SO_2 ABSORPTION SYSTEMS

FOR BLEACH PLANT APPLICATION
SULPHUROUS ACID PREPARATION

G. D. JENSSEN CO., INC.
WATERTOWN, NEW YORK

WESTERN REPRESENTATIVE:
JAMES BRINKLEY COMPANY, Seattle, Washington
FOUNDED 1915

MISCO
STAINLESS STEEL CASTINGS

for all equipment exposed to corrosion by sulphite acids or other corrosive agents

MICHIGAN STEEL CASTING CO., DETROIT 7, MICH.

MEN WANTED—POSITIONS OPEN

We can place—managers, supts., asst. supts. and night supts. for fourdrinier mach. papers, also for mills making paper and pulp, kraft liner, specialty boards, lightweight specialty papers, carbonizing tissue, wet machine fiberboard and for dissolving pulp mill; paper converting plant supts. and foremen; office mgr.; purchasing agent; technical director.

Master mechanics; mechanical, project, electrical and junior engineers; chief engineer for extrusion of polyethylene film in flat sheet form; instrument engineer; industrial engineers; chemists, chem. engineers, laboratory men; assistant plant engineers, salary range $5000-$7000 year.

Salesmen to sell wet machine fiberboard, also belting; cylinder and fourdrinier mach. foremen; die room foreman folding cartons; super calender operator; finishing foreman; beater engineers; machine tenders; back tenders; pulp-paper sales trainee position in New York City.

List your application with us. It will be confidential.

CHARLES P. RAYMOND SERVICE, Inc.
Phone LIberty 2-6547 — 294 Washington St. — Boston 8, Mass.

CALIFORNIA PLANTS FOR SALE or LEASE

New INDUSTRIAL SURVEY gives current facts on plant sites and factories available in Metropolitan Oakland Area (MOA) where tremendous growth spells PROFIT. Sites in urban, suburban and rural areas. Plants built to meet your individual requirements on sites you select. 228 national firms already enjoy MOA advantages: savings in shipping time and cost; major terminus for rail, truck, air, sea carriers; all season production and demand; phenomenal, continuing G-R-O-W-T-H. Serve the multi-billion dollar West market from this hub location. Send for your free Data sheet outlining facts available in our Industrial Survey. Address: Alameda County New Industries Committee, Suite N, 427—13th Street, Oakland, California.

RUBBER-LINED TANKS

19 unused A.S.M.E. code 40,000 gallon pressure vessels, 11'0" dia. by 56'0". Immediate delivery at $11,000 ea. F.O.B. our storage yard. For specifications and additional data, write today:

GEORGE R. MARVIN COMPANY
1601 Taylor Way Tacoma 2, Washington

PAPER TECHNOLOGIST Wanted by IBM

College graduate in the field of paper technology to assist in quality control. Should have experience in paper mill operation and the physical testing of paper and paper products. Excellent working and living conditions, good salary, moving expenses paid, exceptional employee benefits. Write, giving full details, including education and experience to: Mr. W. L. Williams, Personnel Manager, International Business Machines, Endicott, N.Y.

Convert . . .

COSTLY WASTE TO PROFITABLE USE

with a DIAMOND HOG

UP TO 40% FINER REDUCTION . . . MINIMUM BY-PASS

DIAMOND HOGS are used the world over by lumber and paper mills and woodworking industries for fast, economical reduction of slabs, edgings, scrap pieces and other non-metallic materials, green or seasoned, into chips for fuel or commercial use.
SAVE as much as 50% horsepower due to staggered knives that give a clean shear cut the full width of anvil—eliminating strain and overloading.
WRITE for Bulletin H-50—It Will Show You How To Make Waste Pay.

FOR:
PULP MILLS
PAPER MILLS
SAW MILLS
BOX MILLS
STAVE MILLS
HEADING MILLS
WOOD CONVERTERS
TURPENTINE PLANTS

6 Sizes—Capacities 4 to 36 Tons Per Hour, Plain or Roller Bearing

DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING CO. DIV.
1800 N. 2nd STREET, MINNEAPOLIS 11, MINN.

For quick and easy pH Determination

CAMBRIDGE
CONTINUOUS
pH RECORDER

This instrument provides a continuous record of pH in aqueous solutions. Because of its accuracy and dependability, it is extensively used in paper making.

CAMBRIDGE
DIRECT READING
pH METER

This portable, indicating instrument is especially designed and ruggedly built for plant use. Operating directly from line power, it is so simple to use that unskilled workers can and will use it. Of particular value in processing Pulp, Applying Sizing and Reducing Corrosion of Pipes, Fittings and Equipment.

Send for Descriptive Literature

CAMBRIDGE INSTRUMENT CO., INC.

3701 Grand Central Terminal, New York 17, N. Y.

PIONEER MANUFACTURERS OF PRECISION INSTRUMENTS

EST. 1884 CORPORATE 50th ANNIVERSARY INC. 1903

We accept FULL Responsibility for Designing, Installing and Maintaining your corrosion-resistant Tile Tanks and Linings

Our own engineers design the job. Our own skilled crews install it. Our own service men maintain it. One contract covers the whole thing, with responsibility resting squarely on us.

We accept the responsibility; long experience and ample resources permit us to do so.

One typical result: 80% of all chemical pulp made in North America is processed at some stage in equipment built or lined by Stebbins.

SEMCO

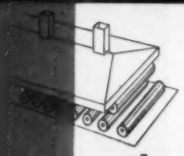
STEBBINS

Engineering and Manufacturing Company, Watertown, N. Y.

STEBBINS ENGINEERING CORP. TEXTILE TOWER SEATTLE, WASH.

NEWCOMB-DETROIT

PIONEERS IN INDUSTRIAL VENTILATION



HEAT & AIR SYSTEMS

that cut cost and increase production in

PAPER MILLS

ESTABLISHED 1912

- DETROIT DIVISION
- GRAND RAPIDS DIVISION
- NEWCOMB INDUSTRIES, LTD., WINDSOR DIVISION

For Bulletins and Quotations, Write

NEWCOMB-DETROIT

5763 Russell St.

Detroit 11, Mich.

MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

The following are quotations to mills, f.o.b. New York:

No. 1 White Shirt Cuttings	14.00 to 14.50
New Unbleached Muslins	16.00 to 16.50
Fancy Shirt Cuttings	6.75 to 7.25
No. 1 Percales	6.75 to 7.25
No. 1 Washables	4.00 to 4.25
No. 1 Light Silesias	9.50 to 10.00
No. 1 Light Prints	7.00 to 7.50
Light Flannelettes	9.00 to 9.50
Cottonades	4.75 to 5.00
Blue Overalls	8.50 to 9.00
Blue Cheviots	8.50 to 9.00
Canton Flannels, Bleached	13.50 to 14.00
Canton Flannels, Unbleached	14.00 to 14.50
Osnaburg Cuttings	9.50 to 10.00
Underwear Cuttings, Bleached	17.00 to 17.50
Underwear Cuttings, Unbleached	17.00 to 17.50
Khaki Cuttings—	
Sun Tan	6.50 to 7.00
Mixed	4.00 to 4.25
Linen Cuttings—	
American	12.00 to 12.50
White	18.00 to 19.00
Grey	18.00 to 19.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

	per cwt.
Roofing—	
No. 1	1.25 to 1.35
No. 2	.95 to 1.05
No. 3 and 4	.80 to .90
Twos and Blues—	
Repacked	2.50 to 2.75
Thirds and Blues—	
Repacked	2.25 to 2.50
Miscellaneous	1.75 to 2.00
Whites, No. 1—	
Repacked	5.50 to 6.00
Miscellaneous	4.75 to 5.00
White, No. 2—	
Repacked	4.50 to 4.75
Miscellaneous	3.75 to 4.00

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Shopperies	

ROPE and BAGGING

f.o.b. and ex dock New York City

	per cwt.
Gunny No. 1—	
Foreign	5.00 to 5.25
Domestic	5.00 to 5.25
Wool Tares—	
Light	5.75 to 6.00
Heavy	6.00 to 6.25
No. 1 Scrap Bagging	4.25 to 4.50
Manila Rope—	
No. 1 large	6.75 to 7.00
No. 1 small	5.75 to 6.00
Sisal Rope—	
No. 1 large	6.00 to 6.25
No. 1 small	5.50 to 5.75
New Burlap Cuttings	6.50 to 7.00
Jute Threads—	
Foreign (Nom.)	6.75 to 7.25
Domestic	6.75 to 7.25
Strings—	
No. 1 sisal	5.50 to 5.75
No. 2 sisal	5.00 to 5.25
Soft jute	5.25 to 5.50
Mixed	3.00 to 3.25

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

	per ton
Shavings—	
Hard White Env. Cuts	115.00 to 125.00
Hard White No. 1	85.00 to 90.00
Soft White, one-cut	75.00 to 80.00
Soft White, No. 1	60.00 to 65.00
Coated Soft	45.00 to 50.00
Fly Leaf No. 1	25.00 to 30.00
Fly Leaf, Woody No. 1	25.00 to 30.00
No. 2 Mixed Col. Woody	20.00 to 25.00
Flat Stock—	
No. 1 Heavy Books and Magazines, Repacked	20.00 to 22.00
Mixed Books	14.00 to 15.00
Ledger Stock—	
No. 1 White	55.00 to 60.00
No. 1 Mixed (Colored)	35.00 to 40.00
Manilas—	
New Env. Cuttings	65.00 to 70.00
New Env. Cuts, One-Cut Extra Manilas	22.50 to 25.00
Manila Tab Cards, Free of Ground Wood	65.00 to 70.00
Colored Tab Cards	45.00 to 50.00
Kraft—	
New Envelope Cuttings	65.00 to 70.00
Tripled Sorted No. 1 100%	40.00 to 45.00
No. 1 Old Assorted	30.00 to 35.00
News—	
White Blank	65.00 to 70.00
Overissue	24.00—
No. 1 Folded	18.00—
Old Corrugated Containers	22.00—
New Jute Corrugated Cuts	26.00—
Mill Wrappers	14.00—
Box Board Chips	11.00—
No. 1 Mixed Paper	10.00—

CHEMICALS

f.o.b. shipping point

Alum (Papermakers)—	
Lump, cwt.	4.55—
Ground, cwt.	4.30—
Powdered, cwt.	4.70—
Blanc Fixe—	
Pulp, bulk, ton	90.00—
Dry, barrels	95.00—
Bleaching Powder—	
Drums, cwt.	5.00 to 6.00
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	28.00—
Argentine, lb.	16.50 to 17.00
China Clay—	
Domestic Filler Bulk (mine) ton	10.00 to 15.00
Domestic Coating Bulk (mine) ton	17.00 to 25.00
Imported (ship side) Bulk (lump) ton	22.00 to 30.00
Chlorine—	
Tanks cars (wks) cwt.	2.90—
Gelatine (silicin), lb.	1.25 to 1.35
Glyc. (C.P.) drums, lb.	44.00 to 44.50
Litharge, powd. bbl. lb.	.15¼ to .16¼

MARKET QUOTATIONS

	New York, per 100 lbs.	
Rosin (Gum)—		
E	8.70—	
F	8.70—	
G	8.70—	
WW	8.90—	
Rosin (Wood), carlots,		
F.O.B. South	4.50 to	4.75
Salt Cake—		
Dom. bulk (wks) ton	17.00 to	23.00
Imp. bulks on dock—		
(Atl. ports) ton (Nom.)	22.00—	
Soda Ash—		
Bulk (works) cwt.	1.35—	
Paper bags, cwt.	1.65—	
Soda (Caustic)—		
Solid drums, cwt.	3.35 to	3.40
Ground and flake, drums,		
cwt.	3.75 to	3.85
Sodium Silicate—		
60 deg. 55 gal. drums, (works) cwt.	1.60 to	1.70
40 deg. 35 gal. drums, (works), cwt.	1.30 to	1.40
Starch—		
Pearl, 140 lb. bags, cwt.	6.39—	
Pearl, barrels, cwt.	6.39—	
Paper (Sp.) bags, cwt.	6.39—	
Powdered, barrels, cwt.	6.60—	
Sulphur (Crude)		
(Mine) bulk, long ton	21.00 to	22.00
Talc—		
Dom. 100 lb. bags (mine) ton	35.00 to	38.00
Canadian	35.00 to	45.00
Titanium Dioxide—		
Barium Pig. bbls., lb.	.21 to	.31½
Calcium Pig. bbls., lb.	.21 to	.31½
Zinc Sulphide, bbls., lb.	11.50 to	11.75

WOOD PULP

Quotations on domestic and Canadian wood pulp, dollars per short air dry ton, delivered consuming mills including basic freight allowances, follow:

Bleached Sulphite	140.00—
Bleached Sulphite, Canadian	145.00—
Unbleached Sulphite	125.00 to 132.50
Unbleached Sulphite, Canadian	130.00 to 135.00
Bleached Soda	140.00—
Bleached Soda, Canadian	140.00—
Kraft, Bleached	145.00—
Kraft, Bleach., Southern	142.50 to 150.00
Kraft, Bleach., Canadian	145.00 to 150.00
Kraft, Unbleached, Northern	132.50—
Kraft, Unbleached, Southern	100.00—
Kraft, Unbleached, Canadian	100.00 to 125.00
Kraft, Semi-Bleached, Southern	140.00—
Sulphite Screenings	72.50—
Sulphate Screenings	67.50—
Groundwood	82.50 to 87.50

Quotations on imported wood pulp, dollars per short ton, on dock American Atlantic ports with varying freight allowances, follow:

Bleached Sulphite, Swedish	130.00 to 140.00
Bleached Sulphite, Norwegian, freight allowed	140.00—
Bleached Sulphite, Finnish, freight allowed	140.00—
Unbleached Sulphite, Swedish	110.00 to 115.00
Unbleached Sulphite, Finnish, freight allowed	120.00 to 125.00
Kraft, Unbleached, Swedish	100.00 to 105.00
Kraft, Unbleached, Finnish, freight allowed	105.00 to 135.00
Kraft, Bleached, Swedish	137.50 to 142.50
Kraft, Bleached, Norwegian	

PAPER

Boards—

Prices per ton, delivered, 10 tons or more:

Plain Chip	70.00—
News vat lined chip	82.50—
Filled news	82.50—
Solid news	85.00—
White vat lined chip	115.00—
Chip tube and can stock	90.00—
Single manila lined chip	120.00—
Single jute lined chip	115.00—
White patent coated:	
.020	155.00—
.018	157.50—
.016	160.00—

Book Paper—

Coated two sides	
70 lb. No. 2 enamel, 25x38-500, trimmed 4 sides	4 cases $17.25 Carloads $16.30
65 lb. enamel, 25x38-500, trimmed 4 sides	4 cases $13.05 Carloads $12.10
Uncoated	
55 lb. No. 2 offset, 25x38-500, trimmed 4 sides	4 cases $14.80 Carloads $13.85
50 lb. A Grade English Finish, 25x38-500, untrimmed	4 cases $14.05 Carloads $13.10
20 lb. envelope, 17x22-500, untrimmed	Carloads $12.4[illegible]
16 lb. tablet, 17x22-500	Carloads $11.3[illegible]

Bag Content Bond—

Extra 100% rag	70.45—
100% rag	62.65—
75% rag	48.15—
50% rag	38.90—
25% rag	31.75—

Bag Content Ledger—

Extra 100% rag	72.65—
100% rag	63.90—
85% rag	52.50—
75% rag	49.40—
50% rag	40.20—
25% rag	33.00—

Sulphite Bond—

Air dry bond (Watermarked)	19.00—
No. 1 bond (M.F. watermarked)	15.00—
No. 2 bond (M.F. watermarked)	14.00—
Plain bond (M.F. unwatermarked)	14.00—

Sulphite Ledger—

No. 1, M.F. watermarked	20.50
No. 2, M.F. watermarked	19.50
Plain, M.F. unwatermarked	19.00

News—	per ton
Rolls, Standard (Contract)	123.00 to 126.00
Rolls (Spot)	(Nominal)
Sheets	138.00—

Tissues (Carlots)—	per ream
White No. 1	1.85—
White No. 2	1.35—
Bleached Anti-Tarnish	2.20—
Colored	2.00—
Anti-Tarnish Kraft	1.75—
Manila	2.00—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.90—
Napkins, full crepe and embossed (12½ lb. to M shts.) per cs.	.90—
Toilet, Bleached (M shts.) per cs.	9.45—
Toilet, Unbleached (M shts.) per cs.	8.00—

Towels	per case
Bleached	6.80—
Unbleached	5.90—

Wrappings (Kraft)—	per cwt.
Standard wrapping	7.75—
Butchers, counter rolls	8.25—
Standard bag, mill rolls	7.50—
Shipping sack, mill rolls	7.75—
Gumming, mill rolls	8.00—
Asphalting, mill rolls	7.75—
Envelope, mill rolls	9.25—

"K" FITTINGS

in

National Institutes of Health Research Hospital

The 14-story building in the background is the new 500-bed clinical center of the Public Health Service, said to be the largest institution of its kind in the world. Dedicated to medical research, the building consists largely of laboratories. A typical floor has approximately 100 laboratories, together with two nursing units accommodating 52 patients who are selected for the observation of certain specific diseases.

Naturally, such a building contains a vast amount of piping. We are proud to say that a substantial number of the fittings were manufactured by us.

"K" Fittings are recognized for soundness, uniformity, and symmetry. They are free from thin walls, sand holes, and cold checks. Threads are tapped full and clean. Machining is precise.

It pays to order pipe fittings from distributors who handle the "K" line.

Good workmanship sells "K" Fittings

K PIPE FITTINGS

CAST IRON AND MALLEABLE

3,000 Shapes and Sizes

Complete information gladly furnished.

THE KUHNS BROTHERS COMPANY

Dayton 1, Ohio

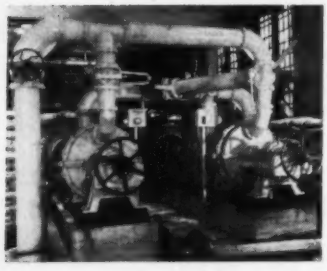
Established 1887

Combined marketing facilities with Malleable Iron Fittings Company, Branford, Conn.

pulp and SARAN RUBBER* go hand in hand!

. . . especially MPC Saran Rubber-Lined Steel Pipe

*a development of The Dow Chemical Company



The extraordinary resistance of Saran Rubber to corrosives makes it an outstanding pipe material for bleached and unbleached pulp, white water, bleach solutions and waste liquors.

Michigan Pipe Company, manufacturers of famous, dependable MPC Wood-Lined Steel Pipe, also offers the paper industry MPC SARAN RUBBER-LINED STEEL PIPE. Available in either fabricated light gauge steel or standard steel, in 10′ and 20′ standard lengths ranging in diameter from 8″ up . . . or fabricated to your exact requirements.

We invite you to submit your particular pipe corrosion problem to our Application Engineering Department.

MPC **MICHIGAN PIPE COMPANY**

Bay City, Michigan

Manufacturers of Wood-Lined Steel, Saran Rubber-Lined Steel, Stainless Steel and Monel Piping. Represented nationally by Saran Lined Pipe Co. Detroit, (Ferndale) Michigan.

The Paper Industry Index to Advertisers

When writing them, please mention The PAPER INDUSTRY.

Refer to the Paper and Pulp Mill Catalogue and Engineering Handbook at your mill office, for complete listing of all advertisers' products.

Advertising Council, Inc.
Airkem, Inc.
American Car & Foundry Co. 5
American Hoist and Derrick Co.
American Lumber & Treating Co. 30
Appleton Machine Co., The
Appleton Wire Works, Inc. 29
Appleton Woolen Mills 10
Armour and Company
Armstrong Machine Works 18
Asten-Hill Mfg. Co.
Atkins Saw Div., Borg-Warner Corp.

Babcock & Wilcox Co., Tubular Products Division 9
Bagley & Sewall Co., The 55
Bailey Meter Company
Barco Manufacturing Co.
Bauer Bros. Co., The
Beloit Iron Works 33
Binks Manufacturing Co. 87
Bird Machine Company 26
Black-Clawson Co., The
Bowser, Inc. 90
Bowsher Co., The N. P. 92
Buffalo Electro-Chemical Co., Inc. 6

Cambridge Instrument Co., Inc. 101
Cameron Machine Co.
Carthage Machine Co.
Chicago Bridge & Iron Company 34
Clark Equipment Company 44
Classified Advertising 101
Cochrane Chemical Co. 99
Colton Chemical Company, The 80
Cuno Engineering Corp. 52
Curlator Corporation

DeZurik Shower Company
Diamond Iron Works, Inc. 101
Dicalite Div., Great Lakes Carbon Corporation
Dilts Machine Works
Dings Magnetic Separator Co. 56
Downingtown Mfg. Co. 11
Draper Brothers Company
du Pont de Nemours & Co., E. I.

Eastwood-Nealley Corporation
Egan & Co., Frank W.
Electric Eye Equipment Co.
Electric Machinery Mfg. Co.
English China Clays Sales Corp. 91

Federal Fawick Corporation
Felker Bros. Mfg. Co.
Fibre Making Processes, Inc.
Fisher Governor Co.
Fiske Brothers Refining Co., Lubriplate Div.
Fitchburg Screen Plate Co., Inc.
Foxboro Company, The
Fritz Publications, Inc. 99, 105
Fulton Iron Works Company

Garlock Packing Co., The 50
General American Trans. Corp.
General Chemical Division, Allied Chemical & Dye Corporation 17
General Dyestuff Corporation
Gilbert & Nash Company
Goslin-Birmingham Mfg. Co., Inc.
Goulds Pumps, Inc. 45
Graton & Knight Co.

Hanchett Manufacturing Co. 24
Hercules Powder Company
Hooper & Sons Co., Wm. E.
Hubinger Company, The
Hudson-Sharp Machine Company 97
Humphrey Elevator Company
Huyck & Sons, F. C.

Improved Machinery Inc. 1st Cover
International Harvester Co.

Jackson & Church Company
Jeffrey Mfg. Co., The 8
Jenssen Company, Inc., G.D. 101
Johnson Corporation, The
Jones & Sons Company, E. D. 23

Kalamazoo Tank & Silo Co. 87
Kelco Company 21
Kewanee-Ross Corporation
Kuhns Brothers Company, The 103

Langston Co., Samuel M.
Layne & Bowler, Inc.
Leeds & Northrup Company
Lindsay Wire Weaving Co., The
Link-Belt Company 16, 95
Lockport Felt Company 79
Lodding Engineering Corp.
Lubriplate Div., Fiske Brothers Refining Co.
Lunkenheimer Co., The 4th Cover

Magnus Metal Corporation 99
Manchester Machine Co., The 51
Manhattan Rubber Division
Mason-Neilan Regulator Co.
Michigan Pipe Company 104
Michigan Steel Casting Co. 101
Midvale Company, The
Midwest-Fulton Machine Co., The 95
Midwest Piping Company, Inc. 15
Milton Roy Company 31
Misco Corporation, The 101
Moore & White Co.
Morden Machines Company
Mt. Vernon-Woodberry Mills, Inc. 42
Murray Mfg. Co., D. J. 20

Nash Engineering Co., The 81
National Aluminate Corp. 2
National Safety Council 100
National Starch Products, Inc. 3rd Cover
Newcomb-Detroit Co. 102
Nichols Engr. & Research Corp.
Noble & Wood Machine Co.
Norton Company

Oakite Products, Inc.

(Continued on facing page)

Oilgear Company, The 7
Oldbury Electro-Chemical Co. 88
Oliver United Filters, Inc. .....
Ontario Paper Co., Ltd. .....
Orr Felt & Blanket Co., The 83

Palladium Mastic Corp. of America 49
Pandia, Inc. 93
Paper and Pulp Mill Catalogue 105
Paper Industry, The 99
Perfecting Service Co. ..... 2nd Cover
Perkins & Son, Inc., B. F. .....
Permutit Company, The .....
Photovolt Corporation 97
Poole Foundry & Machine Co. 95
Powell Company, The Wm. 41
Pusey & Jones Corp., The 37

Raybestos-Manhattan, Inc. .....
Raymond Service, Inc., Chas. P. 101
Read Standard Corporation 32
Red-Ray Mfg. Co., Inc. .....
Rice Barton Corporation .....
Rice Barton Research Corp. .....
Rogers & Co., Samuel C. .....
Roots-Connersville Blower Div. 38
Ross Engineering Corp., J. O. 1
R-S Products Corporation 12

St. Regis Paper Company 14
Sandy Hill Iron & Brass Works 106
Shartle Bros. Machine Co. .....
Shenango-Penn Mold Company .....
Shuler & Benninghofen 59
Smidth & Co., F. L. .....
Stainless Welded Products, Inc. 89
Staley Mfg. Co., A. E. 13
Standard Oil Co. (Indiana) 46
Stebbins Engineering & Mfg. Co. 102
Stickle Steam Specialties Co. 87
Sutherland, Inc. .....
Sutherland Refiner Corp. .....
Swenson Evaporator Company 28
Swift & Company .....

Taylor Machine Works .....
Testing Machines, Inc. .....
Texas Gulf Sulphur Co. .....
Timken Roller Bearing Co. 19
Titanium Pigment Corporation .....
Turner Halsey Company 42

United Iron & Metal Co. .....
U.S.A.—Treasury Dept. .....

Valley Iron Works Company .....
Vanderbilt Co., Inc., R. T. .....

Waterbury & Sons Co., H. 97
Waterbury Felt Co., The 99
Western Precipitation Corp. .....
Weyerhaeuser Timber Co. 4
Whiting Corporation 28
Williams-Gray Company .....
Wisconsin Wire Works 92
Wolferz Alloy Equipment, E. C. 22
Worthington Corporation .....
Wyandotte Chemicals Corporation .....

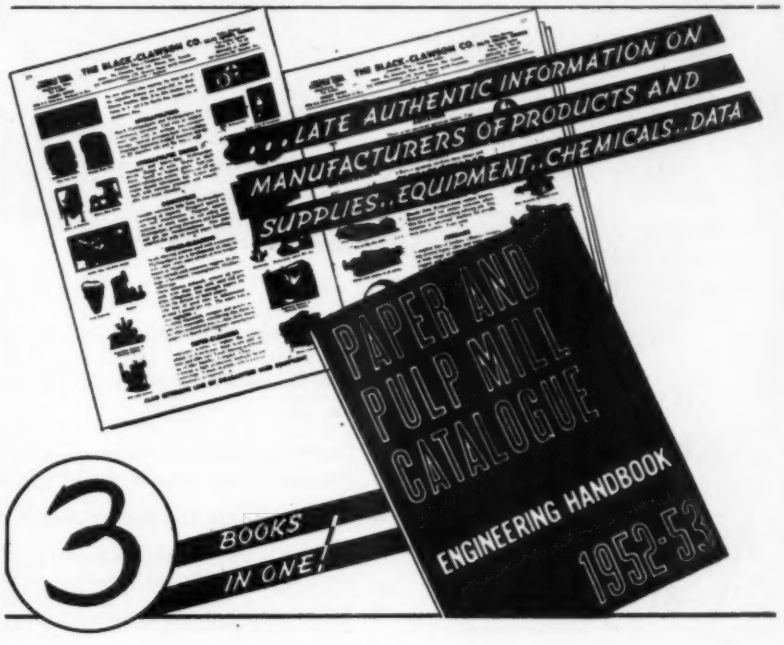
Yarnall-Waring Company .....
Youngstown Welding & Engineering Co., The 83

Professional & Business Services Section
Sirrine Company, J. E. 96

It's in here!

. . . the New 1952-53

Paper and Pulp Mill Catalogue


. . . LATE AUTHENTIC INFORMATION ON
MANUFACTURERS OF PRODUCTS AND
SUPPLIES . . EQUIPMENT . . CHEMICALS . . DATA
PAPER AND PULP MILL CATALOGUE
ENGINEERING HANDBOOK
1952-53
3
BOOKS IN ONE!

1 . . . **Manufacturers Catalogue Section** . . . contains pages and inserts giving exact data on equipment.

2 . . . **Buyers Service Section** . . . includes a comprehensive cross-indexed list of products for this industry, and listings of responsible manufacturers and suppliers.

3 . . . **Engineering Handbook** . . . is an extensive source of vital facts for this industry—quick information for the industry's executives: 128 and more pages of engineering data, graphs, charts, tables, etc.

It's in your Mill Office . . . See it NOW!

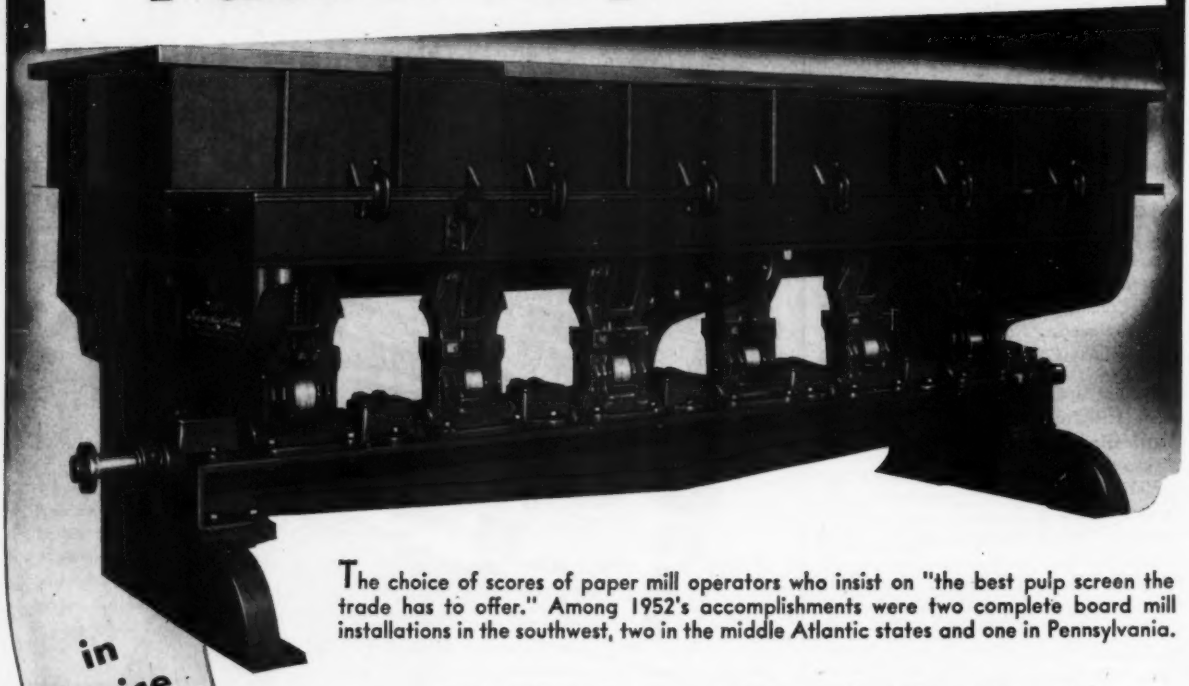
Glance through this exhaustive mine of information. Read about the new equipment available. Write for manufacturers new catalogs. And, whatever your need—look for it in the PAPER AND PULP MILL CATALOGUE.

PAPER AND PULP MILL CATALOGUE *and* The PAPER INDUSTRY *monthly magazine are published by*

Fritz Publications, Inc.
431 South Dearborn Street, Chicago 5

Since 1919
the Service Organization of the Paper and Pulp Industry

Better Capacity! Better Efficiency!
with *Sandy Hill*
Packer Superscreen



in choice of 3 types of drives

The choice of scores of paper mill operators who insist on "the best pulp screen the trade has to offer." Among 1952's accomplishments were two complete board mill installations in the southwest, two in the middle Atlantic states and one in Pennsylvania.

Discriminating mill men repeatedly specify Packers because their experience has proved that Packers:

- Produce higher tonnage of cleaner pulp per plate.
- Offer a more reliable medium for grading and carding fiber bearing stock on either board machine or fourdrinier.
- Require less maintenance and care, resulting in lower operating cost.
- Have sturdy construction that assures a long, trouble-free life.

Packer Superscreen Model LH

This model has a totally enclosed, noiseless roller shoe unit with continuous lubricating system. No oil leakage.

Packer Superscreen Model F

Electric steel casting roller shoes and steel forging cams require less horsepower, lessen vibration, lower maintenance cost. Replacing wooden blocks eliminated.

Packer Superscreen Model T

The original Packer design with hardwood or composition toe blocks for the lowest cost installation.

Sandy Hill's New Brochure of Pulp and Paper Making Machinery is available on request.

The Sandy Hill Iron & Brass Works

Hudson Falls, N.Y.

Machinists and Founders Specializing in Pulp and Paper Mill Machinery

Manufacturers of
Adjustable Cylinder Vats
Cylinder Paper Machines
Kamyr Pulp Grinders
Dandy Roll Drives

Quick Opening Gate Valves
Bertrams Flow Distributors
Bertrams Shakes
Kamyr Stock & Pulp Pumps
Kamyr Vacuum Washers

Neilson Slice
Kamyr Feltless Wet Machines
Selective and Corner Drives
Fourdrinier Paper Machines
Packer Screens

Castings
Kamyr Pulp Bleaching Equipment
Scofield Felt Conditioners
Yankee Fourdrinier Machines
Yankee Cylinder Machines

Associated with Canadian Vickers, Ltd., Montreal, Builders of Sandy Hill Designed Machinery in Canada

MAY 1953